



1992

The Effects of mood on memory and learning : a logical learning theory approach

Mary L. Wandrei
Loyola University Chicago

Follow this and additional works at: https://ecommons.luc.edu/luc_theses

 Part of the [Psychology Commons](#)

Recommended Citation

Wandrei, Mary L., "The Effects of mood on memory and learning : a logical learning theory approach" (1992). *Master's Theses*. 3793.
https://ecommons.luc.edu/luc_theses/3793

This Thesis is brought to you for free and open access by the Theses and Dissertations at Loyola eCommons. It has been accepted for inclusion in Master's Theses by an authorized administrator of Loyola eCommons. For more information, please contact ecommons@luc.edu.



This work is licensed under a [Creative Commons Attribution-Noncommercial-No Derivative Works 3.0 License](#).
Copyright © 1992 Mary L. Wandrei

LOYOLA UNIVERSITY CHICAGO

THE EFFECTS OF MOOD ON MEMORY AND LEARNING:
A LOGICAL LEARNING THEORY APPROACH

A THESIS SUBMITTED
TO THE FACULTY
IN CANDIDACY FOR THE DEGREE OF
MASTER OF ARTS

DEPARTMENT OF PSYCHOLOGY

BY

MARY L. WANDREI

CHICAGO, ILLINOIS

JANUARY 1993

Copyright by Mary L. Wandrei, 1992
All rights reserved.

ACKNOWLEDGMENTS

I am grateful to Joseph F. Rychlak, Ph.D. for his encouragement and guidance of this thesis. His support has extended far beyond official chairmanship of my thesis committee, and his insight and challenges have been a major influence on my ideas. I would also like to thank Jeanne S. Albright, Ph.D. for the expertise she has contributed as the reader on this committee.

I would like to express my appreciation to Bonnie Moran, Judy Nelson, and Arthur Moswin for their assistance in scoring the data of this project. To Arthur Moswin, and to my parents, Barbara and David Wandrei, I am indebted for their patience and moral support that enabled me to complete this work.

TABLE OF CONTENTS

ACKNOWLEDGEMENTS	iii
LIST OF ILLUSTRATIONS	vi
LIST OF TABLES	vii

CHAPTER

I.	INTRODUCTION	1
II.	REVIEW OF LITERATURE	4
	Theoretical Factors	4
	Logical Learning Theory	4
	Basic Assumptions	4
	Dialectic versus Demonstrative	
	Logic	8
	Predication and Meaning	11
	Meaning-Extension	13
	Predication as a Process	15
	Affect	17
	Other Teleological Approaches	18
	Lockean Theoretical Approaches	20
	Basic Assumptions	20
	Lockean Views of Affect	23
	Development of Network Theory	25
	Nodal Network Theory of Affect	27
	Empirical Factors	31
	Research on Logical Learning Theory	31
	Research on Mood and Memory	40
III.	STATEMENT OF THE PROBLEM	50
	Introduction to the Present Studies	50
	Hypotheses	52
IV.	METHOD	59
	Subjects	59
	Materials	59
	Procedure	63
V.	RESULTS	69

Part I.	69
Manipulation Check	69
Mood and Memories	75
Subject Ratings	75
Judges' Ratings	83
Part II.	90
Manipulation Check	90
Mood and Learning	94
VI. DISCUSSION	100
Manipulation Checks	100
Mood and Memory	103
Mood and Learning	106
Conclusions	110
REFERENCES	112
APPENDICES	
A. Music Selections	117
B. Mood Assessment (MA)	118
C. High School Memory Task (HSM)	120
D. Subject Rating Scale: Positive	121
E. Subject Rating Scale: Negative	122
F. Subject Rating Scale: General	123
G. Personal Preference Inventory (PPI)	124
H. Music Rating Inventory/ Auditory Stimulus Rating (MRI/ASR)	128
I. Score Sheet	129
J. Directions for Subjects	130
K. Directions for Judges-Positive/Negative	131
L. Directions for Judges-Overall	137

LIST OF ILLUSTRATIONS

Figure

1. Procedural Flow Chart	64
2. Subject Memory Ratings: Overall	78
3. Subject Memory Ratings: Negativity	80
4. Subject Memory Ratings: Positivity	82
5. Judges' Memory Ratings: Overall	85
6. Judges' Memory Ratings: Negativity	88
7. Judges' Memory Ratings: Positivity	89
8. Learning Task: Percent Hits	98
9. Learning Task: Trials to Criterion	99

LIST OF TABLES

Table

1.	Means (and Standard Deviations) of Mood Scales, Part I.	70
2.	Subject Memory Ratings: Overall Affect, Means (and Standard Deviations)	76
3.	Subject Memory Ratings: Positivity and Negativity, Means (and Standard Deviations) . .	79
4.	Judges' Memory Ratings: Overall Affect, Means (and Standard Deviations)	84
5.	Judges' Memory Ratings: Positivity and Negativity, Means (and Standard Deviations) . .	86
6.	Means (and Standard Deviations) of Mood Scales, Part II.	91
7.	Trigram Learning: Percent Hits and Trials to Criterion, Liked and Disliked Trigrams, Means (and Standard Deviations)	95

CHAPTER I

INTRODUCTION

Since the "birth" of cognitive psychology in the 1950's, theories of memory have multiplied rapidly. While memory has been described in terms of multiple stores, multiple levels of processing, parallel distributed processing, analogical and propositional representation, most of these theories are similar in their reliance on mechanistic principles for their explanation of memory. This trend toward describing the human being in terms of the machine or computer model has continued as these theories have developed in their complexity and depth, and also as they have attempted to integrate memory with other aspects of human experience, most notably affect. However, opposing theories of memory and of affect have accounted for these constructs in thoroughly different ways, either in their definition of the construct "affect" itself, or in the predictions made for the impact of affect on memory.

One major theoretical approach developed by Joseph F. Rychlak is Logical Learning Theory (LLT), which views affect as a cognitive process in itself that is part of a general capacity which human beings have to give meaning to their experience and environment. The introspective nature of this theory is apparent in its attempt to view both memory and affect from the individual's own point of view, as a

purposeful, goal-oriented process of construing or making sense of the world. The testable hypotheses produced by this theory are based on the process of predication, which subsumes both affect and memory, and also predicts and explains relationships between affect and remembered experience.

In contrast, another body of memory theory regards affect as an experience that can be "encoded" in much the same way as other contents of memory are stored. This approach, which culminates in the theory and research of Gordon Bower (1981) and his colleagues, suggests testable hypotheses regarding the method in which memory processes can deal with emotional contents via associations between affective and semantic components. Bower's nodal network theory of affect (NNTA) is extraspective in its emphasis on the mechanisms of memory, which are driven by the frequency and contiguity of occurrence of the material to be remembered.

The numerous empirical studies done on the role of mood in memory processes use a wide variety of methods, and produce diverse results. However, a large proportion of these studies rely on theories similar to NNTA in their explanation of results. One purpose of the present thesis is to demonstrate that such empirical results can also be accounted for by a predication model of learning such as that of LLT. In addition, the study is intended to combat further the myth that an introspective theory such as LLT does not produce testable hypotheses. By clearly delineating both the

theoretical roots of the study as well as the predictions to be tested, this thesis will show that a rigorous experimental design can be utilized by predicational as well as mechanistic psychological models.

The design of this thesis is intended to study in greater detail a situation in which Parrott and Sabini (1990) have demonstrated mood incongruent recall of memories, a finding whose challenge to the predictions of LLT was brought to J.F. Rychlak's attention by W.G. Parrott. The present thesis partially replicates and expands this earlier memory study in order to test its claims against the hypotheses generated by LLT. By further testing the effects of mood on learning itself, this thesis shows the effectiveness of LLT in predicting and explaining the differential effects of mood on both memory and learning.

CHAPTER II

REVIEW OF LITERATURE

Theoretical Factors

The framework in which the current study was conceptualized and carried out is Logical Learning Theory (LLT), developed by Joseph F. Rychlak (1988). My emphasis in this theoretical overview will be on the core assumptions and constructs that define LLT as teleological, critically idealistic, and introspective. These fundamentals differentiate LLT from the mainly mechanistic, "realistic," and extraspective mainstream theories of learning, including those most often referred to in studies of mood and memory.

Logical Learning Theory

Basic Assumptions

The historical context out of which LLT has developed can best be understood by beginning with Aristotle's four types of causality. "Scientific" conceptualizations in the hard sciences such as chemistry or physics are most often thought of as relying on Aristotle's first and second principles of causal explanation: material cause, or the physical stuff out of which a thing is made, and efficient cause, or the driving force which moves the physical thing from one state to

another. In contrast, LLT emphasizes the central role in human experience and behavior of Aristotle's third and fourth types of causality: formal cause, or the essential patterns that compose an object or activity, and final cause, or that reason, goal, objective, etc., for the sake of which any action or process is performed. According to LLT, humans cannot be understood merely in terms of their physical "being" and related drives originating in past experience; it is crucial to take into account the patterns and goals that a person actively frames as ends or purposes for action. For this reason, LLT is a teleological conceptualization of individuals: purposive, goal-directed behavior is seen as the most distinctive aspect and ability of human beings.

Logical Learning Theory makes the claim that people are able to choose goals and ends in an active sense, rather than being passively receptive to externally determined motivations. One tenet essential to this telic sense of the human being is an idealistic view of the world, according to which the person must formulate her own conceptualization or "ideal" of what is both real and meaningful, rather than understanding "reality" to be directly in the world itself. Here LLT draws heavily on the concepts of Immanuel Kant, whose philosophy makes a distinction between the noumena, the actual world existing as itself and unformulated by human knowledge, and phenomena, the world as understood by humans. According to this model, the world is presumed to be in existence

independently of our interaction with it, yet the "true" nature of things is not directly accessible to humans. Instead, a person must utilize her own ability to frame and organize the "raw data" of sensation into a knowable world. Kant speaks of categories of understanding, or inherent "frameworks" for making sense out of "the blooming buzzing confusion" of the world. Rather than assuming that sensory input is directly imprinted on an essentially blank, passive sponge-like mind, LLT continues in the Kantian vein as it views the human person as an active participator in the creation of her own reality. Logical Learning Theory points out that in the widely-used psychological construct of "response," a person's activities are assumed to be directed by the events of the world that happen to the individual. In contrast, LLT uses the construct "telosponse," by which is meant that the person interprets and places meaning upon the world in order to act purposefully. This emphasis on the active construction of reality designates LLT as Kantian and idealistic in its world view.

Another way of understanding the Kantian model is through its definition of and emphasis on meaning. The noumena or external world is only knowable through the organizing principles that Kant calls the categories of understanding; the meaning of any object to be known or understood is dependent upon these categories. One can think of such a category as similar to a pair of eyeglasses through which all

experience is seen. These broad, basic assumptions serve as a starting point for coming to know anything. Kant's categories are some of the most basic of such frameworks: examples are possibility and impossibility, existence and non-existence, necessity and contingency. Without using such basic organizing principles, a person would be unable to learn anything about the world. This is the essence of the Kantian model: One must be able to make basic assumptions which apply to and formulate the meaning of any object or event one wants to learn about.

The personal, individualized nature of this active meaning-making becomes clear when one realizes that each person comes to understand and formulate her own experience of the world in her own unique way. In keeping with its claim to be a theory about people as individual framers of existence, LLT acknowledges this personal nature of meaning, and it does so by taking an introspective view of the human being. This "view from within" means that a psychologist tries to see the contents and events of the world from the perspective of the person she is trying to understand, from a first-person point of view. The observation and understanding of events or behaviors then takes place with the subject, as if "standing in her shoes." LLT maintains that in psychology, the viewpoint of the individual is crucial because she is an agent in creating the reality in which she behaves.

As LLT is examined from the perspective of the

descriptive role of theory, its underlying assumptions become clear. According to its Kantian, idealistic world view, LLT sees humans as participating actively in their own environmental interpretations. The description of this active nature of human behavior is reflected in LLT's avowed teleological emphasis. In addition, the introspective emphasis of LLT uses the "first-person" viewpoint of the individual herself to describe human activity.

While Kant's philosophy provides several background assumptions for LLT, a central question which LLT addresses is how the philosophical concept of "categories of the understanding" can be conceptualized in terms of the psychological processes of humans. The telosponse has thus far been described as a purposeful process of placing meaning onto the environment; however, an in-depth understanding of LLT's explanation of how this happens requires the context of another fundamental concept, that of dialectic logic.

Dialectic versus Demonstrative Logic

In considering the "logical" side of Logical Learning Theory, it is important to distinguish between two forms of logic: dialectic and demonstrative. In demonstrative logic, the parallel between what is known and what is in the world is seen to be a one-to-one correspondence. The facts of the world are "out there," there is one truth to the way things are, and logic is a way of proceeding towards grasping this truth. Scientists using demonstrative logic see themselves as

mapping the universe step by step as they fit data together like puzzle pieces into a whole. Demonstrative logic might be thought of as the rules for fitting the puzzle pieces/elements of experience together. As Rychlak (1988) points out, demonstrative logic is usually linked to material and efficient causes and to an objective, extraspective world view. According to this logic, fixed objects in the material world change because of efficient cause forces pushing in various directions. By using demonstrative logic as a single set of rules, these linear changes can be predicted. The analogy of the world or the person as a giant watch is based on demonstrative logic. There are material-cause "gears," and there is efficiently-caused movement of the gears against each other. The interactions may be very complex, but if the logician qua scientist observes and experiments carefully enough, she will be able to find out exactly how that watch works.

Dialectic logic throws a wrench in the gears. This form of logic is Kantian in that the idea of a single, directly knowable world is rejected in favor of a constructed, interpretive, idealistic world view. Dialectic is based on the idea that for every way of looking at things, in every basic assumption, in every object or concept, there is another inherently opposite aspect. There is no one concept that "is" without there being another concept related to it that is its opposite, at the very least in the sense of its negation.

There are several ways of defining dialectic. It can be seen to be operating in the universe itself, as Hegel postulated and Marx applied in the formulation of a thesis reacting against an antithesis to lead to a synthesis. Dialectic can also be seen in the conceptualization of the human being who tries to make sense of the world. For every "sense" made, there is an opposite case which can be brought to mind. Dialectic can be seen as an interaction between people, as in Socrates' dialectic method of teaching: the student takes one side of an issue and the teacher takes the opposite. By discussing the implications of each side, a conclusion can be reached, not by coming up with the one right answer, but by following the interplay between the two sides and deciding on which side one would personally will stand.

One of the earliest sources for dialectic logic is Heraclitus' concept of change in all things, which is given stability not by fixed bodies of matter, but by the pattern or "logos" which can be seen in the universe. According to this view, the world is not merely material elements being fixed and steady until a force comes along to move or change them. The change and process of reality is always present, and logos is the pattern which lends stability and understanding to this constant process. Dialectic is a form of logos/logic that sees the interplay of opposites in all things, and sees learning and knowledge to be an understanding of this patterned process. In LLT, this oppositionality can be seen

in four distinctive ways--via contrariety ("all X's are A" versus "no X's are A"), contradiction ("all X's are A" versus "at least one X is not A"), negation ("all X's are A" versus "A is not relevant to X"), and contrast ("A is more similar to X, non-A is less similar to X"). Each of these oppositional frameworks offer bipolar conceptualizations of any target.

Now the importance of Kantian-like categories is again emphasized. In dialectic logic, there is no fixed single world of data which will imprint on a person's mind; rather, the pattern or logos is essential to understanding. Such a pattern is the regular, formal cause weaving of meaningful relationships between elements. While some dialectic theorists such as Hegel hold that these relationships are "out there," in the world itself, Rychlak's (1988) formulation of LLT employs both the Kantian, formal cause categories and an introspective view of the person along with the dialectic of logos. The picture of the person that emerges is someone who must conceptualize patterns in her own process of learning about the world. The pattern of relationships between items must be formulated by the person, internally and dialectically. The person can see two sides of things, reason oppositionally, and come to a conclusion based on her conceptualization of how these opposites form patterns.

Predication and Meaning

If a person can always see two sides to everything, how

exactly does meaning arise, much less patterns of meaning? To answer this, LLT begins by defining "to mean" as the act of relating two or more constructs, ideas, or propositions in one's understanding, and "meaning" as the organized relationship thus created between these terms. The act of meaning is possible because human beings are able to not only formulate two sides of any concept, but also to take a stand on or affirm one side or the other. This affirmation would be equivalent to saying to oneself, "I can see A and I can see non-A. The situation could be seen either way. Which way do I see it? I choose A." Neither side of the issue is forced onto the person by a necessary rule, because in a dialectic logic, both aspects are possible for the person to consider and affirm. The person has the capacity to choose one or the other.

It is central to note that the affirmation to which LLT refers does not take place in a vacuum. The person does not consider which side of a purely abstract issue on which to take a stand. Nor is the framework an element or thing in itself; it is a pattern, a way of seeing the world which is brought to bear on or related to a target. The affirmation is made for the sake of some sensation, idea, or any target which is to be made sense of, understood, or learned. Thus, LLT speaks of a larger or broader formulation of meaning which frames a target and thereby gives it meaning. This process of bringing an affirmed framework to bear on a target is called

predication. We say that the broader pattern predicates the target when the person affirms that a certain category encompasses the target. This is analogous to drawing a circle, the broad meaning, around a target. The target thus receives its meaning from the category which is placed around it.

The concept of a predicate here is similar to the grammatical use of the word, in which the verb clause of a sentence is the predicate or pattern of meaning which shapes one's understanding of the subject of the sentence. In "Arthur is handsome," the predicate phrase "is handsome" is affirmed (as opposed to "is not handsome" or "is ugly") for the sake of understanding the target noun "Arthur;" the broader framework is brought to bear on the subject, and in this pattern, in this case the sentence, "Arthur" takes on the meaning "is handsome." Thus, in predication, one affirms one side or the other of a basic, dialectic category or pattern for the sake of a target. By taking a stand for oneself as to where the thing/target falls in one's patterns of understanding, a person predicates that target with the pattern of meaning of the broader category.

Meaning-extension

Another way to look at the formation of these meaningful relationships between predicates and targets is via the concept of tautology. A pure tautology is a relationship of meaning between two items in which they are seen as being absolutely identical in meaning. This would be seen in

associationistic theories to be a result of the two being linked in experience often and close together in time. In LLT, one of the items is seen to be the broad frame of reference or precedent meaning which is targeted towards the other and defines its meaning. An example is "A bachelor is an unmarried male." The concept "unmarried male" is the broader meaning which is extended to the word "bachelor." In this use of tautology, both terms have equal meanings. However, items or concepts can also be partially tautologized when the precedent is of a broader, more basic meaning and something is placed within its purview. This is what happens in predication. The precedent is what is assumed, affirmed, or already known, as in the major premise in a formal syllogism (e.g., All humans are mortal). If a target is proposed in the minor premise (e.g., This is a human), a tautological, necessary relationship of meaning extends from the precedent to the target (e.g., This human is mortal). The formation of this relationship does not take place across time in a linear fashion, as if a force efficiently causes meaning to be attached to the target (e.g., the concept "All humans are mortal" pushing or driving this human to be mortal). Instead, there is an immediate, formal cause ordering of the target concept in terms of the major, predicating concept. Because of the pattern in which it is placed, the target necessarily, (tauto-)logically, or sequaciously takes on the meaning of the precedent assumptions brought to bear on it.

Thus, meaning is seen in LLT as neither haphazard nor embedded in "reality." Instead, meaning is created and extended through the patterns established in a person's fundamental, precedent assumptions or assessments of the world. The "logical" in logical learning theory originates from the idea that the meaningful relationships between concepts are not merely associated through frequency and contiguity of experience, but evolve as a logical consequence of a person's predication of experience. For example, if a person takes the stand that science is the study of purely material and efficient causes, and brings that assumption to bear on the target of psychology, then scientific psychology will necessarily be seen as, and will "mean," a material and efficient cause area of study. The precedent assumptions are seen as predicating the nature of the target for the sake of which understanding is sought.

Predication as a Process

The question naturally arises, if each meaningful relationship stems from preceding, framing assumptions, where do the assumptions "come from?" Logical Learning Theory maintains that a human being is inherently capable of framing these assumptions herself, from (at least) birth on. Predication is not a matter of the contents of the mind, but a process of viewing the world oppositionally, and taking a stand on how a targeted item is to be framed by the spectrum of one's precedent meanings. It is a process in which one

affirms, or oppositionally disaffirms or denies a premise. In the act of affirmation, the meaning of the premise is tautologically, sequaciously extended from this broad, "already known" meaning, be it basic or complex, to the targeted item to be understood or learned.

When the process of extending meaning is "pushed back" to its beginnings, the questions arises: Where does this start? How do we arrive at the most fundamental assumptions or predications? Are we humans not always caught within the confines of what has been put by the world into our brains in the first place? To view cognition this way is to focus on the contents of the mind, as material things that can be moved around or stretched or shifted by efficient-cause forces across time. It is important to remember that predication is seen in LLT to be a telosponsive process of applying formal-cause patterns in a final-cause fashion for the sake of the items to be understood. While there may be a first time the process of predication takes place, perhaps around birth, this is not efficiently or materially caused; the process happens as a basic function of mind organizing targeted items. Just as the stomach acts in the process of digestion, the mind acts in predication. And as food does not "cause" digestion, objects or targets do not "cause" predication. The cause is inherent in the patterns and purposive nature of cognition itself.

Affect

Logical Learning Theory posits that one of the most basic and abstract telosponses human beings make is that termed "affection." In this predication, a person takes a stand on a given sensation or concept as to whether it is a "good" thing or a "bad" thing, whether it is positive or negative, liked or disliked. "Affective assessment" is the name LLT gives to this primary predication, in which a person reflexively views and judges any experience. Affect as an assessment of the meaning of an event is thus differentiated from a purely physiological event such as pain or pleasure; it is a cognitive process which evaluates what an event means to the individual.

Here a fundamental challenge is made to the definition proposed by the James-Lange theory of emotion, according to which emotion is itself the result of physiological arousal. In the definition of LLT, emotion is seen as arising from sensations in the body, but the experience of affect is distinguished as the result of transcending or "turning back" upon any experience, physiological or otherwise, and evaluating, interpreting, and judging those feelings. While the experienced affect of a person may have many intricate connotations forming the pattern of meaning for a target, a basic dimension of positive/good versus negative/bad is seen by LLT to be an underlying, predicating framework used to evaluate experience. Logical Learning Theory's definition of

affect is discussed below in terms of its implications for research.

Other Teleological Theories

Rychlak's (1988) LLT is not alone in its espousal of a teleological, idealistic, introspective view of human beings. All three themes are evident in Alfred Adler's (1914/1956) individual psychology, which holds that a person acts to fulfill her "final fiction," or individual construction of how the world and the self should be. Adler's concept of the "style of life" is the organized pursuit of this goal, which shapes all of the person's behaviors, thoughts and decisions. Adler emphasizes teleology, individual perspective, and a Kantian world-view in his theory, as evident in the following quote:

"Individual Psychology insists absolutely on the indispensability of finalism for the understanding of all psychological phenomena. Causes, powers, instincts, impulses, and the like cannot serve as explanatory principles. The final goal alone can. Experiences, traumata, sexual development mechanisms cannot yield an explanation, but the perspective in which these are regarded, the individual way of seeing them, which subordinates all life to the final goal, can do so" (p. 92, Adler, 1914/1956).

Gordon Allport is also explicit in maintaining, along with the philosopher Leibnitz, that "the person is not a

collection of acts, nor simply the locus of acts; the person is the source of acts" (p. 12, Allport, 1955). In formulating his psychology of becoming, Allport insists that the unique and purposive striving of a person's self or "proprium" is irreducible to efficient causes such as the maintenance of equilibrium. He also distinguishes the proprium from a material "thing," saying that "proprium is a term intended to cover those functions that make for the peculiar unity and distinctiveness of personality" (p. 61, Allport, 1955).

The personal construct theory of George Kelly (1963) also sees humans as constructive, purposive, and unique. While Kelly presumes, as did Kant, that the universe "really" exists, he emphasizes that this universe only influences a person to the degree that she construes or interprets the "facts" as significant in her own world. Kelly's fundamental postulate, "A person's processes are psychologically channelized by the ways in which he anticipates events," is elucidated in several of his corollaries which underline the construction, individuality, organization, and choice-making capability of the human being (p. 46, Kelly, 1963).

The present study of the effect of mood on memory was explicitly guided by the precedent assumptions and specific definitions of LLT. However, as pointed out earlier, most research in psychology, including that on memory and affect, has been based either explicitly or implicitly on different

conceptualizations of what a scientific psychology should be. We turn now to some of these other conceptualizations before describing some widely used explanations of the interaction between emotion and memory.

Lockean Theoretical Approaches

Basic Assumptions

As mentioned above, the fields of physics, chemistry, and biology began their development being called natural or "hard" sciences because of their tradition of empirical exploration of the material and efficient causes of natural events. In the twentieth century, radical shifts have occurred in the paradigms used in each of these hard sciences, leading many "physical science" researchers to abandon the strictures against using formal or even final causation in their theories and hypotheses. However, American psychology's attempts to emulate the hard-nosed, empirical aspects of natural science began long before concepts of relativity or of the participation of the scientist in her own observations gained prominence in the natural sciences. Researchers trying to make psychology a science have most often theorized about human beings using only material and efficient causes as valid forms of explanation.

The philosophy of John Locke is helpful in understanding the implications of the material/efficient cause approach. Locke based his views on the assumption that there are simple,

primary elements out of which all more complex objects in the world or concepts in the mind are composed. The key to understanding a complex being or idea is to break it up into its more elemental, simpler constituents. Locke further proposed that the only way people have any contents in consciousness is through the input of these simple "building blocks" into our minds through sensation. Locke's famous "tabula rasa" analogy represents this process by which basic primary data are imprinted onto the blank slate of a human mind. It is only by the post hoc combination of these "blocks" into more complex structures that humans arrive at abstract or general ideas.

In the Lockean model, the material cause, or "stuff" of human thinking and experience is the original set of elemental building blocks, which are impressed into the passive mind by the efficient cause or "push" of sensations. All other more complex cognitive experiences, from judgments to choices, are explained by reduction to these simpler material and efficient causes. Because these causes are identical with those that are usually used to explain the existence and operation of machines, the Lockean approach can be termed mechanistic. Formal cause patterns and final cause purposes would be seen as epiphenomena that can be explained away in favor of material and efficient causes.

Now the contrasts to LLT's assumptions become obvious, beginning with the very causes upon which a theory rests.

First, in a Lockean model, the formal cause patterns and final cause purposes seen as essential to teleology are reduced to associations between elements which have originated in the natural world. Goal-directed, systematic behavior is seen from this standpoint as originating not from within the person, but from without, from the influences of the world which impact on the person without need for any purpose within the organism.

Second, the highly realistic world view of the Lockean model is apparent, in that it assumes that details of the world itself constitute the elements of sensation that are plotted onto the human understanding. Interpretation is not necessary to understand our environment; our observations are direct and unimpeded, except perhaps by the filtering effect of previous imprints. Whatever patterns of understanding we have resemble literal maps representing pieces of our environment rather than interpretations or construction of events. Putting the pieces of the map together takes place according to the rules of demonstrative, linear logic which is seen as deriving itself from external laws of reality.

Finally, the extraspective nature of a Lockean approach is clear in that the object of study is seen "from without," in third-person ("it") terms, as opposed to the introspective "from within" approach, which employs a first-person ("I") description. A person is seen as being "over there," as something to figure out much as one would scientifically

examine a machine or a plant. The subject's own conceptualizations about the topic at hand are, to the extraspective scientist's understanding, irrelevant at best and misleading at worst. The experience of a person of "making a choice" or "resisting temptation" may seem to her to be purposive or free, but this opinion would not figure into the account of someone working from an extraspective approach. To that scientist, what is observed are the external influences impacting on the object of study and pushing her to behave in one way or another.

Many prominent theorists operate out of the Lockean tradition, incorporating material-efficient cause, realistic world views, and extraspective approaches in their work. Perhaps the most obvious would be the work of B.F. Skinner (1974), whose "black box" psychology relied exclusively on observations of external reinforcers of human behavior. However, it is not only the explicitly behavioristic stimulus-response or "S-R" theories that rely on the Lockean model; modern cognitive models also consider the "organism" in the "S-O-R" to be receiving elements of sensation directly and passively from the world and rearranging these given building blocks according to pathways shaped by past experience, which then drives them to further activity.

Lockean Views of Affect

The research on interface between affect and cognition is often highly Lockean in theory. An example can be seen in

Isen's (1984) review of theoretical implications of mood and memory research. Isen declines to use a "grand theory integrating our efforts and discoveries" (p. 184), yet her implicit reliance on a realist world view and non-telic causation are apparent. She states that her definition of affect is not entirely complete or conclusive; however, she cites investigations of the neurochemical pathways of the brain (material/efficient cause emphasis) and basic perceptual reactions to specific features of a stimulus (direct, real-world input) to outline the parameters within which affect is to be discussed. Isen (1984) specifically rejects an examination of the consequences of the experience of emotion. Instead, she focuses on the impact of affect (defined as essentially equivalent to emotion) on cognitive processes, eliminating phenomenal experience and interpretation from the loop of causation used to explain affect itself. It might be argued that Isen's consideration of the influence of affect on the "meaning" of stimuli is an attempt to admit telic aspects of human behavior to the field of inquiry. However, her discussion makes it clear that she considers affect to be a context which is derived from the environment and/or physiology, which later has an impact on what stimuli are thought to mean. This seems to be more of an efficient cause push of an emotional "force" on the object/stimulus to be understood, rather than an organization and shape given to affect itself by an internally defined, purposive meaning.

Most relevant to the topic of this thesis, mood and memory, is the work of cognitive psychologist Gordon Bower, whose theory of emotion and memory has figured prominently in a majority of research in this field. Many studies explicitly adopt his theory in designing their approach or interpreting their results, while others have primarily utilized the labels for phenomena generated by Bower's (1981) nodal network theory of affect. In either case, it is this theory which represents the major theoretical alternative to LLT for the understanding of the relationship between mood and memory. For this reason, and to better understand the actual empirical work in the field, we will outline here the history, specific constructs, and predictions of Bower's nodal network theory of affect (NNTA).

Development of Network Theory

As controversy arose in cognitive psychology over the primacy of affect versus the primacy of cognition (e.g., Lazarus, 1984; Zajonc, 1984), cognitive psychologists were already including the effects of emotions in their hypotheses and in their explanations of cognitive phenomena. For example, Isen, Shalke, Clark and Karp (1979) discussed the effects of being in a good mood on judgments of events and on the learning of words. They proposed that a cognitive loop between positive thoughts, memories, and associations may facilitate maintenance of a positive mood. This loop was thought to make similarly valenced concepts more accessible

for retrieval, explaining why people in a good mood would be more positive in their recollections of neutral events, and learn positive items more easily. However, the construct of a cognitive loop was not clearly defined in terms of its application to theories of memory.

The predecessor of Bower's (1980) nodal network theory of affect was the network theory of memory as explicated by Collins and Loftus (1975), which seemed particularly suited to the task of explaining the cognitive loop. According to this model, mental concepts are made up of large amounts of information elements, and each unit of information is represented in a "node." The nodes are linked into a network, with characteristics of the concept being represented by links between nodes, each of which is labeled to designate the type and direction of the relationship between the nodes. The appearance of a concept in consciousness is a result of the "activation" of its corresponding node above a certain threshold. The activation of one node results in some degree of activation for any nodes linked to it, thus priming those concepts for possible activation above the threshold. This spreading-activation theory further proposes that the amount of activation that spreads between nodes depends on the links between them, which vary in their accessibility. The strength or travel time of a link depends on the frequency and contiguity with which the concepts represented by the nodes are associated. For example, if the concept of "patient" was

nearly always used at the same time as "doctor," the link going from the "doctor" node to the "patient" node (which might be labeled "treats") would be strong, and much of the activation of the "doctor" node would spread quickly to the "patient" node. Yet if "doctor" were also used in connection with "BMW," but only occasionally, the link ("drives") would be weak, and the second node may only be slightly primed by activation of the first.

Here it is clear that both the nodes and the links employed in network theories are analogized with material cause elements whose "strength" is efficiently caused by the frequent occurrence of stimuli across time. An association is made automatically when two elements are often and closely (in time) presented, much as in the Lockean concept of elements being inscribed on a blank slate. While LLT would see the relationship in "A doctor treats a patient" as a purposive predication of meaning; the formation, linking, and activation of nodes is seen in the network theory as similar to an electrical (material cause) wiring system, powered by input of stimuli or energy (efficient cause) from the external world.

Nodal Network Theory of Affect

In a nodal network, any meaningful idea or proposition can be represented by a node, and any relationship between concepts can be represented by a link. Thus, it was a rather smooth transition for Bower (1981) to adapt this model to the representation of emotion in memory. According to this

approach, each distinct emotion also has a node in the network, which is connected via associative links to other nodes for all the aspects of that emotion, such as verbal labels, autonomic reactions, expressive behaviors, and descriptions of situations which have evoked or could evoke that emotion. For example, the emotion of anger might be linked to the word "anger," the physical feeling of having a flushed face and a tense neck, the action of shaking one's fist and yelling, and the situation of being cut off on the expressway.

The links between each of these nodes for propositions, events, and emotions vary in strength, depending on the degree of association between the concepts. If a person experiences an emotion (e.g., sadness) in conjunction with a particular event (e.g., failing a test), concept (e.g., death), or word (e.g., "blue") or , a link between the emotion node and the node for this item will form, or if it already exists, the link will be strengthened.

An important emphasis of Bower's (1981) formulation of a nodal network theory of affect is that, much like Collins and Loftus' (1975) spreading activation theory, the activation of one node can spread to all nodes connected to it, whether that node represents an emotion or a particular event from one's life. Thus, if the nodes which represent the propositions describing one's high school prom are activated, an associated node for happiness may be activated. If the activation level

exceeds the "happy" node's threshold, the emotion of happiness would be experienced.

An emotion node can also be stimulated directly by external events - for example, if a person receives a gift - and the resulting activation would spread through the network to connected nodes. Associated nodes representing words such as "pleasant," actions such as smiling, or similar events such as going to a party, would receive some of the spreading activation, and may either be primed to a subthreshold level of excitation, or cross the threshold and emerge into consciousness. Additional excitation of a primed emotion node can additively lead to "firing" and consequent conscious experience. Furthermore, the firing of a specific emotion node itself should, according to this theory, spread its excitation along these links to prime other nodes, such as emotional events or words, and facilitate their activation.

The Lockean tradition is quite evident in Collins and Loftus' (1975) network theory, and its extension in Bower's (1981) NNTA. The basic elements of a complex idea or emotion, as represented in nodes, are reminiscent of the material cause building blocks emphasized by Locke. The drive of spreading activation between nodes is an efficient cause explanation for the way a person stores, arranges, and retrieves these mental materials. In contrast to LLT, meaning is essentially irrelevant to NNTA. If meaning were to be addressed, it would likely be defined as the activation of nodes as triggered by

current external stimuli, in addition to frequency and contiguity of past associations. Bower (1981) outlines his viewpoint thus:

"A relevant analogy is an electrical network in which terminals correspond to concepts or event nodes (units), connective wires correspond to associative relations with more or less resistance, and electrical energy corresponds to activation that is injected into one or more nodes (units) in the network" (p. 134).

In this system, a human being's experience of meaning would certainly not be a central cause itself in predicating behavior; it would be seen as a by-product of the firing of these nodes in response to external stimuli, with little room for teleology at all.

Before turning to the empirical research done in both the Kantian tradition of LLT and the more Lockean traditions such as the work of Bower, a final distinction must be made between the two. While both traditions are empirically rigorous in their research, the differing viewpoints on how knowledge is gained lead each side to approach research differently. When knowledge is seen as dependent on the assumptions or predications of the observer/participant, empirical research becomes a way of validating the claims made by a theory with observation. This is the "top down" approach taken by LLT: explicit predictions made by the theory are tested in order to see if the constructs we use to explain the world fit with the

observed world. When knowledge is seen as being derived directly from the observations themselves, as in the view of a realist, theory is less prominent in guiding the actual research, instead being put together piece by piece from the observed "facts." The "bottom up" approach of the dustbowl empiricist attempts to rule out bias in the observation of events by keeping theories small and directly tied to observation. This seems to be more the case with NNTA, which is referred to in many studies of mood and memory not as a guiding formulation of the research, but as an explanation of the observed phenomena.

Yet, as pointed out, both approaches rely on empirical observation in order to test and communicate their scientific formulations. Often these two paths converge upon a particular topic of investigation. Thus, both LLT and NNTA research arrived at the topic of mood and memory interactions via, quite different routes. The next step of this review is to document the research leading up to the present study, from both the LLT and NNTA perspectives. Since the current thesis is informed primarily by LLT's approach, we will begin with the research supporting its claims.

Empirical Factors

Research on Logical Learning Theory

The central tenet of LLT is that human beings predicate or personally construe meaning for every aspect of interaction

with the world. This use of predicate assumptions also occurs in scientific settings, in both the activity of the experimenter and the subject of the experiment, whether this is explicitly acknowledged by the researchers or not. The emphasis of research on LLT has been to put the contributions of the subject's predications directly into the design of studies, so that this process can itself be examined. One of the goals of empirical investigation of telic aspects of human learning and experience is to measure predication as an explicit, evaluative, and intentional variable, and "to assert that it is at play in every experimental study done on human beings" (Rychlak, 1988, p.323).

To do this, LLT researchers turned to affective factors involved in learning, which have been under investigation ever since Tait (1913) followed Wundt's tripartite theory of emotion to find that pleasant words were easier to learn than unpleasant words. Many other studies confirmed this finding in various formats of rating involving pleasantness and learning tasks. Logical Learning Theory's prediction of easier learning of liked words is based on the hypothesis that a positively assessed item is more consistent in a formal cause manner with most people's current first premises - that is, a generally positive outlook on life - and thus meaning can be more congruently extended to it, facilitating learning. Researchers investigating LLT's predictions demonstrated this positive effect under conditions where people did approach the

experiment with positive precedent assumptions; this phenomenon was labeled by Matlin and Stang (1978) the "Pollyanna principle." "Liked" items were learned more quickly than "disliked," whether learning occurred with lists of all positive, all negative, or both kinds of items, whether the learning format used a series of items or paired associates, whether rate of learning was measured by trials-to-criterion, recognition, or free recall (Abramson, 1967; Laberteaux, 1968; Rychlak, 1966). Rychlak and his colleagues explained this methodological phenomenon by proposing that the judgment of an item as "liked" or "disliked" is a basic evaluative predication, in which a person takes a stand on how she feels about the object. The conceptual ordering of experience that takes place in this "affective assessment" guides further learning, or meaning extension, along a consistent, patterned, formal cause route.

Research on LLT has aimed at establishing that this affective assessment is a truly individual and telic process. This process has been shown to influence learning independently of Lockean constructs such as the history of reinforcement of a word, frequency of contact with the items, or associations that could be generated from the item. To establish this independence, it was first necessary to devise a method by which the prior familiarity or reinforcement history of items could be measured. Therefore, consonant-vowel-consonant (CVC) trigrams were utilized in learning, for

which normative data has been developing to measure the "wordlikeness" of the item. Archer's (1960) norms were developed by presenting all possible consonant-vowel-consonant combinations (e.g. HIB, MOY, ZUC) to subjects and having them rate each according to whether it looked like a word, sounded like a word, or could be used in a sentence. This nomothetic measure is often referred to as "association value" (AV), and the Archer norms can be used as a criterion for familiarity of a CVC trigram.

A Lockean theorist would predict faster learning of items which are already familiar to a person, because the higher frequency with which the item had been presented would, in network theory terms, prime the node associated with the item and facilitate its later firing. Links between an item and other nodes are also strengthened by frequency of presentation, which may further enhance familiarity. The actual liking of an item may itself be explained as a link between the item and the "liking" or "disliking" node, or as a number of links to other positive emotions. If frequent presentation (experienced as familiarity) strengthens these links, it would be concluded that AV, the degree to which an item resembles something familiar like a word, underlies the phenomena of learning liked trigrams.

A major accomplishment of LLT research was to show that affective assessment (AA) has an effect on learning apart from the effect of AV. Abramson, Tasto, and Rychlak (1969) found

that no matter how familiar or unfamiliar trigrams were to subjects (as measured by the nomothetic norms), items affectively assessed as positive were more easily learned by normal subjects than those assessed as negative. AA effects functioned statistically independently of nomothetic AV effects. This same independence of effects was found when familiarity of the items was idiographically assessed for wordlikeness: while familiar-looking items were learned more quickly than unfamiliar ones, positive affective assessment still had a statistically independent influence on learning (Abramson, Tasto, and Rychlak, 1969).

Another strategy for establishing the central role of affective assessment in learning was to look at the degree to which associations could be generated for trigrams, the challenge to LLT being that familiarity of items causes them to be liked. Thus, the trigrams more strongly associated with words might be both better liked and better learned, not because a positive predication facilitates learning, but because familiarity, an externally derived, efficient cause, drives both liking and learning. This explanation would be supported by Zajonc's (1968) research on an "enhancement effect," whereby sheer frequency of exposure to stimuli increased positive ratings of them.

In contrast to the argument that familiarity underlies both liking and learning, later research found that this enhancement occurred only when a stimulus was considered to be

positive in the first place, and the effect was not seen when the items were rated negatively originally (Brickman, Redfield, Harrison, and Crandall, 1972). The idea that positive predication or liking is not reducible to the frequency of presentation, an efficient cause, led Kubat (1969) to ask subjects to generate associations for those words previously rated on the affective assessment measure. This research found no relationship between number of associations and positive AA, substantiating the claim of independence of predication from pure frequency of contact.

A third approach to validate the independence of affective assessment was to counter the charge that "liking" could be a covert designation of an item as "easy to learn." An extensive study done by Rychlak, Flynn, and Burger (1979) used factor analyses on data generated by subjects on lists of trigrams and/or words rated according to several forms of instructions (including AV, AA, easy/hard to learn, often/rarely used, easy/hard to pronounce, and others). The essentially orthogonal factors that emerged showed two dimensions: association value and affective assessment. Ratings of "easy/hard to learn" loaded very little on either dimension, but less on the AA factor than on the AV factor. A second factor analysis cross-validated the independence of the AA dimension from the AV dimension.

The extensive research on AA as an independent influence on learning cleared the way for affective assessment as a

telic construct to be investigated empirically in its own right. The topics in which AA has been found to be significant are diverse, including experiments on brain lateralization, impression formation, and sharing behavior in children. Among these, the field which seems most directly relevant to research on mood effects on memory is that concerning the process by which a person's basic precedent assumptions (e.g. "Life is good" or "I hate myself") are extended through affective assessment.

In this area of research, LLT looks at how attributing meaning to items is involved in a person's individual life situation. For example, the prediction of learning positive items more easily rests on the concept that people usually have a precedent, or background view of themselves, their lives, and their environment in general as positive. Learning of items in the environment is facilitated if a similar positive meaning is extended to them. But what if people have a negative view of their surroundings or themselves? For those with a negative assumption predicating their judgments, it should be predicted that negative items, being more consistent with that pattern, are learned faster.

To investigate this, LLT researchers looked at several situations in which negative predications were involved: mental illness, negative view of self, negative areas of life, and negative attitudes towards the task. People with psychiatric diagnoses were thought have more negative views of

life in general, therefore being more likely to attach meaning to and better learn negative items. This hypothesis was supported in learning studies involving both acute and chronically mentally ill people with mixed diagnoses (Rychlak, McKee, Schneider, & Abramson, 1971), and major depression patients (Mosbacher, 1984). When these patients were matched for age, gender, and social class with normal subjects, it was found that the trend to learn positive items to be greatly diminished and even reversed in the psychiatric samples. Thus, the subjects' precedent negative assumptions were sequaciously extended to negatively assessed items, allowing learning to take place more easily along negative lines.

Similar results were found for elementary (August, Rychlak, & Felker, 1975; August & Rychlak, 1978) and high-school (Rychlak, Carlson, & Dunning, 1974) subjects who rated their view of themselves on positive/negative dimensions. Students who had more positive regard for themselves, i.e. a positive predication of themselves, learned "liked" trigrams and words more easily, while those with negative premises about themselves learned negatively predicated items more easily.

Another creative approach was to select words to be learned from areas of life which subjects previously rated as agreeable or distressing, such as competition or interpersonal relationships. When words from these domains were affectively assessed as positive or negative and subsequently memorized,

subjects learned liked words better in those realms seen as "good" (predicated positively), and disliked words better in the "bad" realms (predicated negatively) (Rychlak, Carlson, & Dunning, 1974). In another study, the "realm" to be rated was the learning task itself, in which subjects affectively assessed the task by observing it beforehand. Those who disliked the task showed a diminished tendency to learn "liked" items quickly, as compared to those who rated the learning task as positive (Rychlak & Marceil, 1986).

This body of research on LLT makes clear the relevance of each individual subject's precedent assumptions that are brought to the learning task. Whether they involve life in general or the task itself, these predications inform the learning process: Learning takes place most easily with those items to which meaning is extended consistently or congruently with the evaluative pattern (positive or negative) that a person is already using to assess her surroundings. Furthermore, the importance of predication in learning has been shown to be independent of purely associative or familiarity qualities of items; hence, affective assessment effects cannot be "explained away" via these mechanistic principles.

The consistent meaning extension necessary to learning would also be expected by LLT to apply to the retrieval of already learned material; for example, in the process of recall. The positive or negative predications a person uses

to organize her experience, including her memory, would frame the kinds of memories she recalls. One approach that seemed amenable to empirical testing of this hypothesis was that suggested by the definition of affect given above: Affect is the process of extending basically positive or negative meaningfulness to emotional and contextual events. If a general affective assessment of these events or surroundings is negative, one would say the person is in a negative mood, while a generally positive evaluation would place a person in a positive mood.

This brings the topic of mood into LLT's realm of investigation. Before outlining how the present thesis empirically investigated the effects of mood on both memory and learning, this review turns to the many other studies done on the mood/memory interface.

Research on Mood and Memory

As mentioned in the theoretical overview above, a large amount of research in the area of mood and memory has either directly or indirectly involved Bower's (1984) nodal network theory of affect. While not all studies cite NNTA as a primary source of information or conceptualization, its widespread influence warrants the use of its predictions here as an organizing format for examining the empirical research in the field. This section will therefore outline NNTA's predictions for mood-dependent recall, mood congruency and its variants, and the studies testing these phenomena.

In the phenomenon of mood dependent recall (MDR), an item can be remembered better when a person is in the same mood at the time of recall as when the item was encoded. Mood dependent recall is proposed to occur in the retrieval of both naturally occurring events, such as attending a fundraiser, and experimentally presented material, such as a word list. The phenomenon of MDR is predicted by NNTA because of the links that are said to form between an item being encoded and the emotion experienced contiguously, at the time of encoding. If at a later time, the same emotion node is stimulated, activation should spread to the associated item node, priming that node and facilitating its threshold activation.

The first demonstration of an MDR effect was described by Bower, Monteiro, and Gilligan (1978, experiment 3), in which recall of a given target list of words was best when a hypnotically induced mood state (happy or sad) during recall was the same as that during learning of that list. The MDR phenomenon was also observed by Bartlett, Burleson, and Santrock (1982, experiment 2), in which they induced moods in children by having them think of happy or sad experiences. When two separate word lists were learned in differing moods, free recall at a later time was best for the list whose mood state matched the mood at encoding. Mecklenbrauker and Hager's (1984) results showed MDR in subjects whose mood was manipulated by the Velten (1968) procedure, a widely-used mood induction in which a number of statements are read

corresponding to either a happy ("I feel great today!") or sad ("I'm fed up with it all") mood. In this study, subjects who read a story in a negative mood recalled more of the story when they were in a negative mood later, as compared to when they were in a positive mood. A symmetrical effect was found for subjects who read the story in a positive mood; these subjects recalled more when in a positive mood later than when in a negative mood. Eich and Metcalfe (1989) also found that when happy or sad music was played to induce mood, a word list was remembered better on a free recall task when mood at recall matched mood at encoding, especially when the words to be remembered were generated by the subject.

In the phenomenon of mood congruence, a proposition or event is more easily brought to mind because its emotional valence is similar to one's current mood. In the more particular phenomenon of recall congruency, "subjects' thoughts, free associations, fantasies, interpretations, and judgments are thematically congruent with their mood state" (Singer & Salovey, 1988). Recall congruency is predicted by NNTA because the activation of a particular emotion should spread to events associated with that emotional tone, represented as nodes linked to that emotion node. This subthreshold activation or priming of similarly valenced memories should lead to more rapid or more frequent retrieval of those memories compared to events whose nodes were not connected to the currently activated emotion node and thus not

previously activated or primed.

Some early examples of recall congruity include a study by Teasdale and Fogarty (1979), in which pleasant memories of personal experiences were more quickly recalled by happy relative to sad subjects. Similarly, Teasdale and Taylor (1981) observed that sad subjects were more likely to recall sad memories than happy memories in response to a neutral cue word, while happy subjects were more likely to generate happy memories. Studies by Natale and Hantas (1982) and Alexander and Guenther (1986) both found that happy subjects produced more happy memories than sad memories on free recall tasks, while sad subjects produced more sad memories. More recently, a unique mood induction used by Ehrlichman and Halpern (1988) used pleasant and unpleasant odors circulated through a laboratory to produce positive and negative moods. They also found that subjects in a pleasant mood produced more positive memories associated with a neutral cue word, while subjects in an unpleasant mood produced more negative memories.

Another special case of mood congruity is encoding congruency (Singer & Salovey, 1988; Blaney, 1986), in which events whose emotional loading is similar to the currently experienced emotion are more easily learned. In this case, an event or item is not yet encoded, but the learning of the item is enhanced when it is similar to the themes and associations linked to the activated emotion node. For example, if someone is in a depressed mood, she might learn negatively-toned words

("misery," "unfulfilled") more easily than positively-toned words ("joy," "success"), since these can be elaborated in terms of concepts already primed by spreading activation from the emotion node.

Several examples of research can be found to support the encoding congruency hypothesis. Sad subjects have been found to recognize (Natale & Hantas, 1982) and recall (Alexander & Guenther, 1986) more negative than positive words from a list that had been presented earlier as part of bogus personality tests. Both Teasdale and Russell (1983) and Caprara, Spizzichino, and Romeo (1989) produced similar results: Sad subjects recalled more negative words from a word list learned previously in a neutral mood, while happy subjects recalled more positive words. Brown and Taylor (1986) found that positive words were recalled more easily than negative words by happy subjects. Rinck, Glowalla, and Schneider (1992) demonstrated mood congruence in the learning of words with a strong emotional valence on a free recall task. In a related experiment, Small (1985) demonstrated the effect of mood on basic levels of cognitive processing, by showing that on a tachistoscopic recognition task negatively-toned words congruent with a negative mood were recognized at lower time thresholds than positive words.

While the phenomena of MDR and mood congruence appear to be clearly defined and demonstrated in a variety of settings, the literature also contains many studies in which these

effects were not so clearly demonstrated. A view of these conflicting results will bring us to the rationale of the present study.

The occurrence of MDR appears not to be as robust as Bower and other researchers first believed. Bartlett, Burleson, and Santrock (1982, Experiment 1) found that, in contrast to their second experiment, when children relaxed rather than played with puzzles before mood inductions (via thinking of happy and sad experiences), no MDR effects emerged on learning of word lists. Wetzler (1985) also reported no facilitation of word list learning when the mood at recall matched the mood at learning. In fact, Bower and Mayer (1985) could not replicate MDR effects using the same procedure as in the original Bower, Monteiro, and Gilligan (1978) study. In Brown and Taylor's (1986) study, neither phonemically rated ("rhymes with XXX?") nor self-referenced ("describes you?") traits were recalled better when mood at learning and recall were matched. No MDR was seen in Eich and Metcalfe's (1989) study when subjects were asked to recognize rather than recall words learned in similar as opposed to different moods.

Another challenge to predictions of MDR comes from the unique study of Lewis and Williams (1989), who examined mood dependent recall and mood congruent recall simultaneously. The central feature of the study was the composition of the list of words to be learned out of words previously rated by subjects on the affective assessment measure used in LLT

research. When these words were learned by subjects who were induced into positive or negative moods by hypnosis, both mood congruent and mood dependent recall of words were later observed. However, MDR was only observed for those items which were congruent with the subject's mood at recall. In other words, mood congruity appeared to be underlying the MDR effects.

While mood congruity has appeared to be a more robust phenomenon than mood dependent recall, some research has demonstrated an inconsistency of mood congruency effects. Mecklenbrauker and Hager (1984) found no congruency between the emotional valence of information recalled about a story and the emotions experienced by subjects. Hasher, Rose, Zacks, Sanft, & Doren (1985) found that when subjects were divided into happy and sad groups according to their naturally occurring moods, rather than by experimentally induced mood, no congruency occurred between story information recalled and experienced mood. Clark and Teasdale (1985) found mood congruency effects for women on a free recall task, but not for men. Macleod, Tata, and Mathews (1987) also found that identification of words on a lexical decision task was not influenced by a match between the item's emotional valence and subjects' mood, while Small and Robins (1988) found that on a lexical decision task, subjects induced to be depressed recognized both dysphoric and elated content words at briefer exposures than neutral words.

There have also been findings of a reversal of the mood congruency effect. For example, Brown and Taylor (1986) found that sad subjects learned positive words faster than negative words on a free recall task. Rinck, Glowalla, and Schneider (1992) also found mood incongruent learning for words that were slightly emotionally toned as opposed to highly emotional words. Similarly, an extensive study by Parrott and Sabini (1990) found that in both naturally occurring moods and experimentally induced moods, the first of three autobiographical memories produced by subjects tended to have the opposite emotional tone as the currently experienced emotion. In other words, a happy subject would first produce a sad memory, while a sad subject first produced a happy memory.

As shown by this review of studies on mood and memory phenomena, several challenges and inconsistencies have not yet been resolved. Several explanations have been suggested for failures to replicate findings on MDR, including experimenter bias, procedural differences in experiments, and type of mood induction (Bower and Mayer, 1985; Mayer and Bower, 1985). While these explanations have generally been in favor of preserving the NNTA model, Bower and Mayer (1985) also acknowledge that the evanescent quality of MDR as a phenomenon may challenge the theory that predicts it:

"The failure to find an MDR effect impacts negatively upon many theories that expect it. It not only

contradicts Bower's (1981) specific theory of mood as an active retrieval cue, the failure impacts more generally upon any theory that supposes that internal states act as contexts that can become associated with memories of coincident events and can cue retrieval of them" (p. 42).

Mayer and Bower (1985) also suggest that the phenomenon of MDR may only be observed when the subject perceives her mood as "causally belonging" to the to-be-remembered item, rather than mood and item being merely coincident events. In other words, the subject must view the item as causing the mood in some way. This explanation adds a factor not previously addressed by the core propositions of NNTA: the attributions of the subject in the experiment. Mere contiguity of mood and event does not lead to consistently observed association between them, thus necessitating an additional explanatory construct in NNTA. The "causal belongingness" added here almost resembles a pattern of relationships between stimuli which must be formulated by the subject. This is a concept on a completely different level than the automatic firing of nodes to cue associated memories. In fact, it suggests a hint of formal causation which is otherwise quite foreign to NNTA.

While Bower and Mayer (1985) saw the lack of consistency for MDR effects as "assuredly an unhappy and thoroughly regrettable state of affairs," Logical Learning Theory has something more positive to offer. As Lewis and Williams (1984) demonstrated, the idiographic patterns of predication

of the subject are central in learning and memory. These evaluations are not added to LLT, they make up the pivotal process that formulate all aspects of experience, including words, events, and mood itself. The present thesis was designed to examine the interplay of mood, memory, and learning, with predicational patterns included in theory and methodology from the start, rather than included as an afterthought. The development, rationale, and predictions of the study are outlined in the next section areas, particularly that of mood incongruent recall as found by Parrott and Sabini (1990).

CHAPTER III

STATEMENT OF THE PROBLEM

Introduction to the Present Study

The present study views affect from a Logical Learning Theory (LLT) perspective. To quote Rychlak (in press), "Affective assessment is a transcending telosponse; that is, an innate capacity to reflexively target and thereby evaluate the meanings of one's cognitive contents (premises, concepts, predicates, etc.) characterizing them as either liked (positive evaluation) or disliked (negative evaluation) in quality. Logical learning theory holds that affection is the most basic and abstract cognition carried on by a human being". According to LLT, all contextual material and emotional experience is predicated by the most basic of precedent assumptions, that of affect. Therefore, the results brought to J.F. Rychlak's attention personally by W.G. Parrott came somewhat as a surprise. The challenge to LLT was that in Parrott and Sabini's (1990) Experiment 4, the first of three memories on a recall task was sad or negative for subjects who were in happy moods (seen in LLT to be a positive predication), while this first memory was happy or positive for subjects in sad moods. In contrast to this mood incongruency of the first memory, LLT would predict that the

pattern of positive meaning of a subject's mood would have been more readily extended in a recall of a positive memory.

After studying Parrott and Sabini's (1990) experiments, Rychlak and this writer pinpointed several areas, particularly with regard to scoring, in which further study could facilitate an understanding of these results in light of LLT. Specifically, Parrott and Sabini (1990) obtained a measure of positive and negative affect of recalled memories from two independent judges, not from subjects. From an LLT standpoint, the idiographic, personal evaluation of the subjects themselves would be a more valid measure of the affective quality of these subjects' memories. In addition, it seemed that Parrott and Sabini (1990) viewed "positive" and "negative" as two separate constructs which were therefore scored by judges on two independent scales. Similarly, "happy" and "sad" were isolated in mood measurements as two separate scales. In contrast, LLT regards "positive/negative" and "happy/sad" as oppositional, inherently connected concepts which are more appropriately measured on a bipolar dimension, with "more positive (or happy)" intrinsically implying "less negative (or sad)."

This thesis was therefore planned as a partial replication of the mood and memory studies of Parrott and Sabini (1990), in which these researchers' methods would be utilized. In addition, however, the subjects' own predications and the oppositionality of the frameworks

themselves would be recognized and measured.

The thesis also extends LLT's examination of mood congruity beyond recall of memory to the realm of learning itself. Predication, the central concept of LLT, is a formal and final cause process which has been tested in numerous other areas of learning. This study was intended to address the area of mood and learning, in which the material and efficient causation of NNTA has been suggested to be an insufficient explanation (Bower & Mayer, 1985). The following hypotheses and the rationales behind each one outline the predictions of the thesis.

Hypotheses

Hypothesis I: It is predicted that positively and negatively toned music will serve as a context which people use when evaluating their mood.

- A. People will become more happy/less sad after listening to happy music.
- B. People will become more sad/less happy after listening to sad music.
- C. People who listen to happy music will be more happy/less sad than people who listen to sad music or people who do not listen to music.
- D. People who listen to sad music will be more sad/less happy than people who listen to happy music or do not listen to music.
- E. The predictions A through D above will be supported

in both Parts I and II of the experiment.

Rationale: In order to replicate Parrott and Sabini's (1990) Experiment 4 as closely as possible, similar musical programs and measurements of subjects' mood were used in this thesis. Yet, the predictions, understanding and explanation of observable phenomena are based on LLT's principles. As noted above, LLT regards predication as a basic process which occurs in the understanding of all personal contexts and experiences. Methodologically, this means that when a prominent context such as music is presented to a subject, she will affectively assess that context as positive or negative, depending on her musical preferences. A positively predicated context or background will serve as a framing pattern whose positive meaning is sequaciously, immediately extended to include other experiences within that context, such as the present mood state. In contrast, a negatively predicated musical context will be used by the subject to frame experiences negatively. It is important to note that while the experimenter presented musical programs which she assumed (based on pilot testing) to be positive or negative, it was up to the subject to actually predicate this context as positive or negative. For example, a person's natural evaluation of the experimental context or her general mood may be a more personally relevant framework for organizing her recollections. It was therefore necessary to test this hypothesis in both parts of the experiment before assuming that the methodological manipulation of mood via

music was successful.

Hypothesis II. It is predicted that mood will not change as a result of recalling memories.

Rationale: This hypothesis addresses Parrott and Sabini's (1990) explanation of their mood incongruent findings. Their thought was that a positive or negative memory may be recalled in contrast to a negative or positive mood, respectively, in order to balance or "repair" the mood and keep it from becoming too extreme. While this formulation does have an intentional ring to it, LLT does not view predication as itself caused or pushed by drives to maintain equilibrium in any realm, including emotion. Instead, predication is the telosponse which is done for the sake of the targeted experience to be understood. Therefore, LLT rejects the prediction that recalling memories will act as an efficient cause to change a person's mood over time.

Hypothesis III: It is predicted that people will recall events that are congruent in affective value with their current mood state. All three memories recalled by people in a happy mood will be more positive/less negative than those recalled by people in a sad or neutral mood, while memories recalled by people in a sad mood will be more negative/less positive than those recalled by happy or neutral subjects. This prediction will be supported only when subjects' own predications and the

inherent oppositionality of positivity/negativity are taken into account:

A. Mood congruency will be observed when subjects rate the memories on a single, overall scale in which positivity and negativity are at opposite ends of the bipolarity.

B. Mood congruency will not be observed when subjects rate the memories according to how positive they are or how negative they are on separate scales.

C. Mood congruency will not be observed when independent judges rate the memories according to how positive or negative they are on a single scale.

D. Mood congruency will not be observed when independent judges rate the memories according to how positive they are and how negative they are on separate scales.

Rationale: Assuming a successful methodology in which subjects do take on positive or negative moods, this hypothesis relies on the subjects' use of mood as a predication itself. A happy mood would be seen by LLT as a positive framework which would predicate tasks targeted by the subject. If that task is to recall a memory from the recent past, LLT predicts that the meaning of the precedent assumption ("I feel happy," "Life looks pretty good," etc.) will be more readily extended to memories which themselves have been positively assessed. In contrast, a sad or depressed mood would be a negative

predication which frames recollections consistent with that sad organization of memory. This consistent, congruent predication would hold for the retrieval of each of the three memories requested of the subjects; unlike Parrott and Sabini's (1990) mood incongruency, which occurred only on the first of three memories, this hypothesis predicted that all three memories would be congruent with the framing predication of mood.

However, as discussed above, this predication is fundamentally idiographic: the person who recalls the event simultaneously "takes a stand" on the material and judges it. Therefore, the congruity between the affect of the event and the mood which frames it will only be apparent when the individual predication of each subject is examined, by asking them about that affect. Furthermore, LLT emphasizes the intrinsic oppositionality of the "positive/negative" dimension. It is therefore expected that "independent" ratings of what are essentially "two sides of the same coin" will obscure any apparent congruity between mood and memory.

Here the fundamental differences become clear between the explanations of observed phenomena given by LLT and Lockean theories: A Lockean model may not inherently distinguish between the "first person" perspective of the subject and the "third person" perspective of a judge in rating the "object" of a memory. Neither would a Lockean model attribute as much importance to the oppositional nature of any concept, instead

viewing independent ratings of "positive" and "negative" as more closely approximating the elements of reality.

Hypothesis IV: It is predicted that people will better learn those items that are affectively congruent (as individually assessed) with their current mood state.

A. People in neutral and happy moods will learn positively assessed, or "liked" items more quickly and accurately than they learn negatively assessed or "disliked" items.

B. People in a sad mood will learn "disliked" items more quickly and accurately than they learn "liked" items.

Rationale: Just as mood is seen as a predication for framing the meaning and affective quality of recalled memories, the predicational nature of happy and sad moods is also predicted to serve as an organizing frame for learning new material. As has been demonstrated by the extensive LLT research on learning (e.g. Rychlak, McKee, Schneider, & Abramson, 1971; Mosbacher, 1984), the precedent assumptions brought by the subject to a task have a direct influence on the organization and learning of affectively assessed material. This hypothesis is therefore an extension of previous research showing that depressives (Mosbacher, 1984) and low self-esteem (Rychlak, Carlson, & Dunning, 1974) subjects use their negative predications to extend meaningfulness more readily toward negative items in their experience, while non-depressed

or positively predicating subjects extend meaningfulness more easily along positive lines. It is then predicted that experimentally-induced mood will also serve as a predication which facilitates learning of items assessed as consistent or congruent with the framework, as compared to those that are assessed as inconsistent.

CHAPTER IV

METHOD

Subjects

Subjects were 68 females and 22 males who participated in the experiment as part of an Introductory Psychology course requirement. Subjects were informed in the sign-up sheet that they were agreeing to participate in a two-day experiment, and were allowed to select the times that would be most convenient for them. Of the 142 people who signed up for the experiment, the 90 subjects who completed the entire experiment were included in the analyses. Fifty-two subjects were excluded for the following reasons: failure to show up for or complete Part II of the experiment (30 subjects), experimenter or equipment error (e.g., incorrect administration of learning task; 12 subjects), failure to complete or insufficient completion of forms in Part I of the experiment (10 subjects).

Materials

Mood was induced using the musical mood induction procedure (MMIP), employed in previous studies, as well as by recent pilot testing by the writer, as an effective mood enhancer (Parrott & Sabini, 1990; Clark & Teasdale, 1985).

The MMIP consists of audiotaped music which has either a "happy" or "sad" emotional tone, to which a subject listens for a specified amount of time. Some research using the MMIP (e.g., Parrott & Sabini, 1990, Experiment 3) has instructed subjects to use the music to "get into" a designated mood. However, the present study followed Parrott and Sabini's Experiment 4 (1990) in eliminating such explicit mood specifications, in order to avoid demand characteristics which might influence subjects to provide mood-congruent memories only to please the experimenter. In addition, eliminating instructions to "get into mood X" allows the subject to use the music to frame his or her environment individually and personally, rather than as explicitly defined by the experimenter.

Accordingly, the MMIP used in this experiment consisted of two approximately 60-minute music programs, one designated happy, one sad. For each program, the same music used by Parrott & Sabini (1990) was used, and additional music was also selected for its positive or negative overtones. In order to avoid confounding the mood type of the music with any specific memories that the subject relates to a specific piece of music, and to avoid the semantic cues that could arise from song lyrics, music was selected that does not contain lyrics and that was not likely to have been popular during the subjects' high school years. A list of titles and segment lengths for each program can be found in Appendix A.

The Mood Assessment (MA) instrument measured the subjects' actual mood in a manner similar to that used by Clark and Teasdale (1985) and Parrott and Sabini (1990). The subject rated to what extent 11 adjectives describe her/his mood at the present moment, using a rating scale anchored by *not at all* (1), *moderately* (4), and *extremely* (7). Four scales (happiness, sadness, uncertainty, and anxiety) are derived from the measure by averaging appropriate items. Subjects' scores on the happiness scale and on the sadness scale were used in the data analyses. The items and scales for the MA can be found in Appendix B.

The High-School Memory (HSM) task is an event recall task consisting of a form on which the subject is instructed to describe, in writing, three specific events that happened during his/her high school years. The HSM also instructs subjects to describe their feelings at the time of the event. The form for the HSM can be found in Appendix C.

Subjects rated each memory given on the HSM using three different scoring systems, as instructed by three forms. The first two forms used a rating process similar to that of Parrott and Sabini (1990), in which subjects rated how positive the event was (Positivity Scale) separately from how negative it was (Negativity Scale). Each form uses an individual rating dimension, with the Positivity Scale anchored by *not at all positive* (1), *moderately positive* (4) and *extremely positive* (7), and the Negativity Scale anchored

by *not at all negative* (1) *moderately negative* (4) and *extremely negative* (7). Subjects were also asked to rate the memory on an Overall Scale, according to how positive or negative the event was in general, using a dimension ranging from *extremely negative* (1) to *extremely positive* (7). These three scales can be found in Appendices D, E, and F, respectively.

The items to be learned in Part II were selected from Rychlak's (1966) Phonetic Preference Inventory (PPI). This is a list of 140 consonant-vowel-consonant trigrams selected from Archer's (1960) norms. The norms assign each trigram an association value (AV) score according to the proportion of people who associated a wordlike quality to that trigram. The trigrams presented in the PPI trigrams were selected from the middle range of the Archer norms (44-78% AV). Subjects in this study rated how much they like each trigram on a 4-step dichotomous dimension, with possible ratings of "like much," "like slightly," "dislike slightly," or "dislike much." From the PPI, which was administered twice in Part I, eight reliably liked and eight reliably disliked trigrams were selected to make up an individualized list of four liked pairs and four disliked pairs of trigrams for each subject. The PPI can be found in Appendix G.

The Tennessee Self-Concept Inventory (TSCI) served as a distractor task between the two ratings of the PPI. This inventory consists of 100 self-descriptive statements which

the subject rates on a scale with anchors of *completely false* (1) to *completely true* (5). The scales yielded by the TSCI were not employed in data analyses.

A Music Rating Inventory (MRI) was used to allow subjects to "rate the auditory stimuli" as instructed. The MRI asked subjects to identify any of the music that they were familiar with, and to rate the music program on its loudness, on how distracting it was with respect to the other tasks, and on any emotions that may have been elicited. As this inventory was provided only to facilitate the procedure outlined below, none of these ratings were used in data analyses. A copy of the MRI can be found in Appendix H.

The eight pairs of trigrams were learned in Part II of the experiment using a memory drum in which one trigram at a time can be viewed in an open window, at two-second intervals. The list of eight trigrams was presented by showing the trigrams of a pair consecutively for one second each, with a two-second blank space appearing between pairs. The memory drum's four windows enable the list of pairs to be presented in four different randomized orders, to avoid a subject's use of serial position cues to facilitate learning. The accuracy of each subject's responses were recorded on an individualized score sheet, which can be found in Appendix I.

Procedure

The procedure and design used in the present thesis is outlined in the flow chart in Figure 1, and described below.

FIGURE 1
PROCEDURAL FLOW CHART

Part I Procedure

Happy and Sad Conditions
(30 Subjects in each group)

Rate mood (MA1)
Hear happy or sad music (MMIP)
Rate mood (MA2)
Recall three memories
(HSM)
Rate mood (MA3)
Assess trigrams (PPI1)
Rate affect of memories
(P and N Scales)
Complete "filler task"
(TSCS)
Assess trigrams (PPI2)
Rate affect of memories
(O Scale)
Rate "auditory stimuli" (MRI)

Neutral Conditions
(30 Subjects)

Rate mood (MA2)
Recall three memories
(HSM)
Rate mood (MA3)
Assess trigrams (PPI1)
Rate affect of memories
(P and N Scales)
Complete "filler task"
(TSCS)
Assess trigrams (PPI2)
Rate affect of memories
(O Scale)

Between Parts I and II

Experimenter prepares individualized trigram lists

Part II Procedure

Happy and Sad Conditions
(30 Subjects in each group)*

Rate mood (MA4)
Hear happy or sad music (MMIP)
Rate mood (MA5)
Learn trigram list
Rate "auditory stimuli" (MRI)
Debriefing

Neutral Condition
(30 Subjects)*

Rate mood (MA5)
Learn trigram list

Debriefing

*10 Subjects each from Part I's Happy, Sad, and Neutral conditions.

Post Experiment:

Judges rate memories (Parrott and Sabini [1990] method)
Judges rate memories (Overall method)

Part I

Part I took place on the first day of the experiment. After anonymity and confidentiality had been guaranteed and the subjects had consented to participate, they were told that several experiments would be taking place over the two day period. For subjects assigned to a mood condition, reference was made to the rating of auditory stimuli in "the present experiment." For all subjects, experiments on memory recall and trigram rating were mentioned. Mood was then assessed for the first time using the Mood Assessment (MA1).

Following this introduction, those subjects assigned to a mood condition were instructed to listen to the music which they would be rating after a delay period. They were asked to refrain from talking so that everyone in the group could experience the music as fully and deeply as possible, and were told not to think about evaluation of the auditory stimuli at this time, but simply to relax and listen to the music. They were also informed that after about eight minutes of music, the "filler tasks," related to the other experiments, would be administered to assure that all subjects participated in the same activities during the delay. Either the "happy" or "sad" MMIP program was then played, during which the experimenter was present to assure that subjects did not interact with each other.

After eight minutes, a packet was distributed which contained the following materials, in order of appearance:

Mood Assessment (MA2); HSM; Mood Assessment (MA3); PPI1; Positivity and Negativity Scales (counterbalanced for order across subjects); TSCI; PPI2. Subjects were allowed to work at their own pace on the packet, and upon completion were administered the Overall Scale for rating the memories (without being allowed to refer to their other ratings) and the Music Rating Inventory. In the experimental groups, the MMIP music continued to play as all the above tasks were completed.

Those subjects assigned to the Neutral mood condition did not hear any music; rather, they were administered the packet of materials directly following the introduction to the experiment. They also received the Overall Scale for memory rating upon completion of the packet, but the Music Rating Inventory was eliminated.

Between Parts I and II, the individualized list of eight trigram pairs (four reliably liked pairs, four reliably disliked pairs) was constructed for each subject by the experimenter for use on the learning task of Part II.

Part II

In Part II, which took place on the day directly after Part I, each subject was tested individually. If the subject did not listen to music in Part I, and was assigned to a mood condition in Part II, the "auditory stimuli" experiment was explained as in Part I. After all subjects were reminded of the several experiments taking place across the two days, the

subject's mood was assessed (MA4). Each of the subjects who were assigned to a mood condition listened to eight minutes of music, this time with the experimenter out of the room. A final mood assessment (MA5) was followed by the learning task. Subjects assigned to the Neutral condition began the learning task directly after the fourth mood assessment (MA4). Music continued to be played in the mood conditions as the learning task was administered.

The paired associate learning task used a method of anticipation. Detailed instructions of the following processes were provided orally to each subject along with examples, and all questions were answered prior to beginning the trials. In the open window of the memory drum, each trigram in the list of pairs was presented individually, and the subject said each trigram aloud in whatever pronunciation s/he preferred, relating the pairs by saying "goes with" between their individual appearances. For example, the first pair might be pronounced as "RAJ goes with... PIB." After all eight pairs had been pronounced in this way, the subject moved to the next window, in which the same list of pairs was presented with the pairs in a different order. Each presentation of the entire list was considered a trial. Learning of a pair was indicated by the subject's using the first trigram of a pair as a cue to correctly name the second trigram of the pair before it appeared in the window. The experimenter kept track of correctly named pairs as the trials

continued, until the subject could correctly name all the pairs in a row on two consecutive trials. At this point, the subject was considered to have learned the entire list and was congratulated. A final music evaluation was administered for subjects in the mood conditions.

The debriefing, which concluded the testing session, included a discussion of the intent of each step of the experiment, the hypotheses being tested, a presentation of the results of the subject's learning trials and description of any observed patterns, and an opportunity to ask questions about the experiment and the theory behind it. Verbatim instructions for administering Parts I and II of the experiment can be found in Appendix J.

Two independent judges were trained on Parrott & Sabini's (1990) coding system, which was provided via personal communication with the author. According to this method, each memory reported on the HSM was scored by these judges on both "Positivity" and "Negativity." The judges remained blind to the experimental condition of each subject, and the average score of each memory was used in data analysis. In addition, two additional judges were trained to score each memory on how positive or negative it is "Overall." This method was adapted from the scoring system developed by Parrott and Sabini (1990). Directions for both methods of scoring can be found in Appendices K and L, respectively.

CHAPTER V

RESULTS

Part I.

Manipulation Check

Hypothesis I predicted that positively and negatively toned music would serve as a context which people use when assessing their mood. Specifically, it was expected that subjects' mood ratings would be more happy and less sad when mood is rated in the context of happy music. Also, ratings are expected to be more sad and less happy when mood is rated in the context of sad music. This hypothesis was tested each time the musical mood induction procedure (MMIP) was employed, in Parts I and II of the experiment, in order to test the effectiveness of the experimental manipulation of mood. The results are presented and discussed in order of the procedure of the study.

To test Hypothesis I for Part I of the experiment, the dependent variable was subjects' mood as measured by the two scales, happiness and sadness, as derived from the first two mood ratings (MA1 and MA2; see Table 1). A higher score on the happiness scale, which ranged from 1 to 7, indicated a happier mood for the subject, while a higher score on the

sadness scale, which also ranged from 1 to 7, indicated a sadder mood.

TABLE 1

MEANS (AND STANDARD DEVIATIONS) OF MOOD SCALES,
PART I

MOOD CONDITIONS		MOOD SCALES	
		Happiness	Sadness
Happy	Before MMIP	4.04 (1.18)	2.26 (1.10)
	After MMIP	4.34 (1.13)	2.17 (1.25)
	After Memories	4.23 (1.29)	2.21 (1.25)
Sad	Before MMIP	3.49 (1.22)	2.41 (1.42)
	After MMIP	2.86 (0.95)	3.04 (1.42)
	After Memories	2.98 (1.04)	3.23 (1.62)
Neutral	Before MMIP	3.80 (1.06)	2.66 (1.43)
	After MMIP	3.80 (1.06)	2.66 (1.43)
	After Memories	3.98 (1.07)	2.76 (1.46)

Note. Higher scores on the happiness scale indicate a happier mood, whereas higher scores on the sadness scale indicate a sadder mood.

The scale scores for happiness and sadness at each time of measurement were entered into a repeated-measures multivariate analysis of variance (MANOVA). The design had one between-subjects variable, mood condition (happy music, sad music, or no music) and two within-subjects variables: time of measurement (before and after the MMIP) and mood scale (happiness scale and sadness scale). Subjects who did not hear music only rated mood once (MA2) before the memory task.

For these subjects, both the "before MMIP" and "after MMIP" mood ratings were considered in the following analyses to be identical to this single rating. According to Hypothesis I, a three-way interaction should occur, indicating that changes in mood ratings at different times of measurement should vary relative to the mood condition and relative to the mood scale.

As predicted, there was a significant three-way interaction between mood condition, time of measurement, and mood scale, $F(1,87)=9.02$, $p<.001$. Analysis of the simple interaction of mood condition and time of measurement, when the type of mood scale was held constant, showed significance for ratings of happiness, $F(2,87)=10.00$, $p<.001$. This simple interaction was also significant for ratings of sadness, $F(2,87)=5.00$, $p<.01$.

In order to test corollaries A and B of Hypothesis I, which predicted that the MMIP itself was effective in manipulating subjects' mood, the next step was to analyze the simple main effect of the time of measurement variable, when mood condition was held constant. For subjects in the sad mood condition, ratings of happiness after the sad music were lower ($M=2.86$) than they had been at the beginning of the experiment ($M=3.49$; $F[1,29]=10.59$, $p<.01$), while ratings of sadness after the MMIP ($M=3.04$) were higher than before the music ($M=2.41$; $F(1,29)=7.00$, $p<.05$). For subjects in the happy mood condition, there was a trend toward significance for the increase in ratings of happiness after the happy MMIP

(\underline{M} =4.34) as compared to after the music (\underline{M} =4.04; $\underline{F}(1,29)=2.98$, $p<.10$]. In this group, however, ratings of sadness after the MMIP (\underline{M} =2.17) were not significantly lower than before the happy music (\underline{M} =2.26; $\underline{F}(1,29)=.22$, $p=.642$).

The results of this analysis support corollaries A and B of Hypothesis I that music will be a context taken into account as subjects assess their mood: Subjects who heard happy music tended to become more happy (but not more sad), while subjects who heard sad music became both less happy and more sad. The sad music thus appeared to be seen as a more powerful context for subjects than did the happy music.

To address corollaries C and D of Hypothesis I, that subjects of different groups will differ in mood depending on the mood condition assigned, a second examination of the simple interaction between mood condition and time of measurement was undertaken. An analysis of the simple simple effects of mood condition at each time of measurement revealed that before the MMIP, subjects in the three different conditions were not significantly different on either happiness, $\underline{F}(2,87)=1.75$, $p>.15$; or sadness, $\underline{F}(2,87)=.73$, $p>.45$. However, after the respective MMIPs, there was a significant difference between groups for happiness, $\underline{F}(2,87)=15.47$, $p<.001$; and a trend toward significance for sadness, $\underline{F}(2,87)=3.10$, $p<.06$.

Follow-up t -tests revealed that subjects who heard happy music rated happiness significantly higher (\underline{M} =4.34) than

subjects hearing sad music ($\underline{M}=2.86$; $\underline{t}(58)=5.53$, $p<.001$). Similarly, in this happy MMIP condition, sadness was rated significantly lower ($\underline{M}=2.17$) than in the sad MMIP condition ($\underline{M}=3.04$; $\underline{t}(58)=-2.55$, $p<.05$). Subjects who heard sad music also rated happiness significantly lower ($\underline{M}=2.86$) than did subjects who heard no music ($\underline{M}=3.80$; $\underline{t}(58)=-3.64$, $p<.01$), but did not rate sadness ($\underline{M}=3.04$) as significantly different from subjects who heard no music ($\underline{M}=2.67$; $\underline{t}(58)=1.02$, $p=.310$). There was a trend toward significance for the difference in happiness ratings between subjects in the happy mood condition ($\underline{M}=4.34$) and subjects who heard no music ($\underline{M}=3.80$; $\underline{t}(58)=1.53$, $p<.07$). However, there was no significant difference on sadness ratings between those subjects who heard happy music ($\underline{M}=2.17$) and those who did not hear music ($\underline{M}=2.67$; $\underline{t}(58)=-1.44$, $p<.20$).

These results are interpreted as showing that subjects who heard music in Part I of the experiment not only changed their moods in a direction consistent with the musical context, but that this change also resulted in significant differences between groups, depending on the type of music heard. Thus, corollaries C and D of Hypothesis I are supported: Subjects hearing happy music were observably more happy and less sad than subjects hearing sad music, who assessed their mood as more sad and less happy. Inspection of these means also shows that after the happy music, subjects rated themselves above the midpoint of 4 on the happiness

rating scale, and below the midpoint of 4 on the sadness scale. In contrast, after the sad MMIP, subjects in the sad mood condition rated happiness below that scale's midpoint of 4, while their ratings on the sadness scale neared the midpoint of 4. Hypothesis I is seen as being supported in its prediction that subjects use music as a context for assessing their mood.

To test the prediction of Hypothesis II that mood ratings should not change as a result of recalling emotionally toned memories, the mood ratings before and after the memory task (MA2 and MA3) were compared (see Table 1). The scale scores for happiness and sadness at each time of measurement were entered into a repeated-measures MANOVA. The design had one between-subjects variable, mood condition (happy music, sad music, and no music) and two within-subjects variables: time of measurement (before and after the MMIP) and mood scale (happiness and sadness). All subjects, including those who did not hear music, rated their moods before and after the memory task, and both ratings were used in the following analyses. If Hypothesis II is correct, there should be no significant effect for time of measurement alone or in interaction with the other variables, since the task intervening between the two mood assessments was not predicted to affect subjects' mood.

As predicted, no significant effects were found for the time of measurement variable before or after the memory task:

the three-way interaction was not significant, $F(2,87)=.07$, $p>.93$, nor were there significant interactions of time of measurement with mood scale, $F(1,87)=.24$, $p>.60$; or with mood condition, $F(2,87)=1.12$, $p>.30$. The main effect of time of measurement was also nonsignificant, $F(1,87)=1.74$, $p<.20$. These results support Hypothesis III, which predicted that mood will not change as a result of recalling memories.

Mood and Memories

Hypothesis III predicted that people would recall events which were congruent in affective value with their current assessment of their mood. To test this hypothesis, both the subjects' own ratings of recalled events and the ratings of trained judges were employed.

Subject Ratings

The subjects' ratings of their memories on the overall, global scale of the dimension "positivity/negativity" were investigated separately from their independent ratings on the positivity and the negativity scales.

To test corollary A of Hypothesis III, which predicted mood congruency of memories when affect was rated on an oppositional dimension, the overall scale of positivity/negativity of the memories was used as the dependent variable. The scale ranged from 1 to 7, with a score above the midpoint of 4 meaning a more positive affective quality of the memory, and a score below the midpoint meaning a more negative

affective quality. Ratings were made on this scale for each of the three memories recalled by subjects on the High School Memory task (see Table 2).

TABLE 2
SUBJECT MEMORY RATINGS:
OVERALL AFFECT
MEANS (AND STANDARD DEVIATIONS)

MOOD CONDITIONS	POSITIVITY/NEGATIVITY		
	Memory		
	1	2	3
Happy	5.63 (1.70)	5.17 (2.24)	5.24 (1.92)
Sad	4.87 (1.96)	4.63 (2.37)	3.70 (2.63)
Neutral	5.07 (2.23)	5.07 (2.24)	4.93 (2.26)

Note: Higher scores indicate more positive affect; lower scores indicate more negative affect.

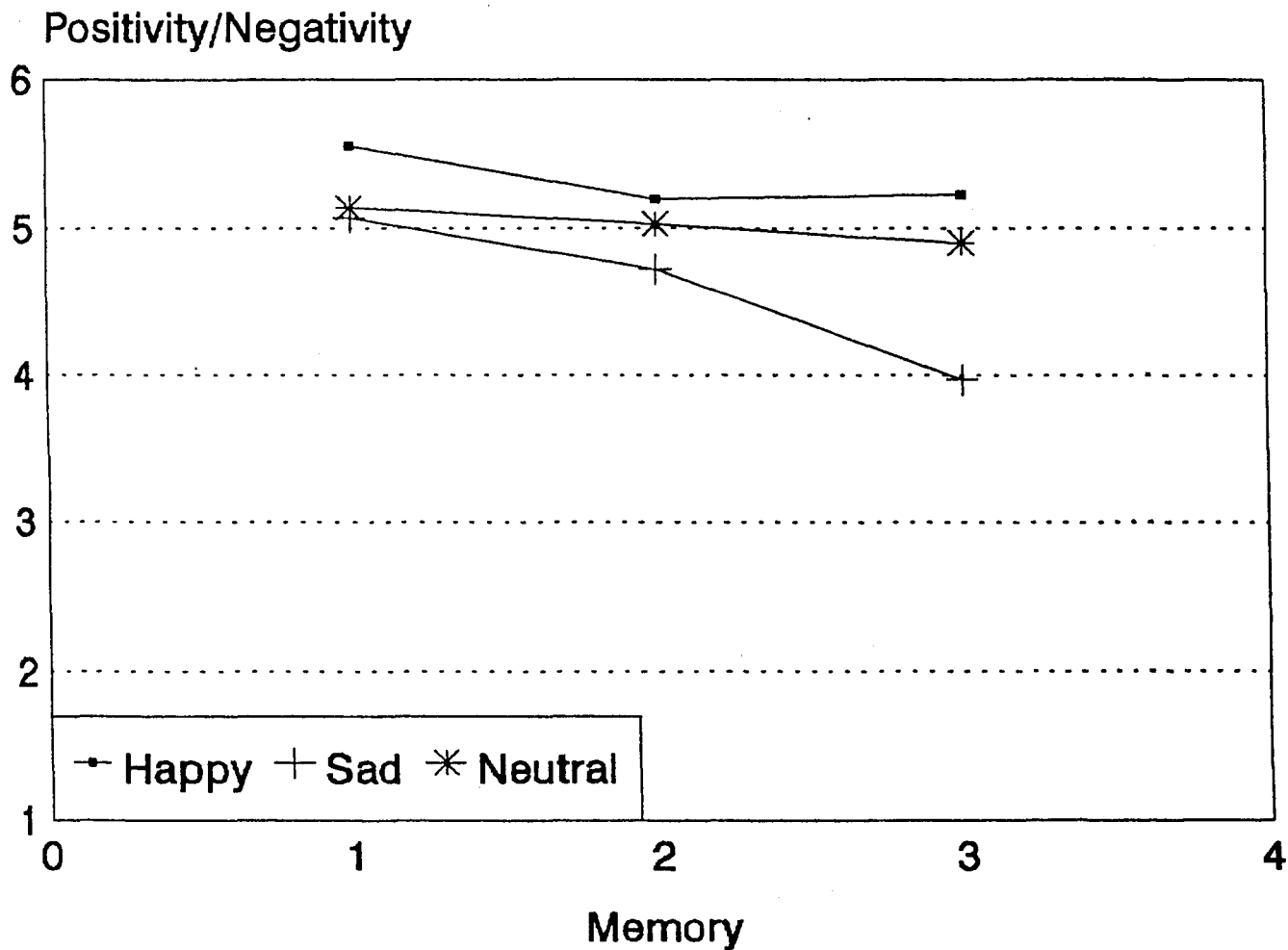
Subject ratings of each memory on this overall scale were entered into a repeated measures MANOVA with one between-subjects variable (happy, sad, neutral mood condition) and one within-subjects variable (first, second, or third memory recalled by each subject). According to corollary A of Hypothesis III, the subjects' idiographic ratings using an oppositional scale should lead to an observation of mood congruency, as evident in a significant effect of mood condition. In addition, no effects of memory number were

expected, either in interaction with the other variables or as a main effect.

This analysis showed no effects of an interaction between mood condition and memory number, Hotelling's $T^2=.025$, $F(4,166)=.52$, $p>.71$. No main effects were observed for mood condition, $F(2,85)=1.83$, $p>.16$, or for memory number, Hotelling's $T^2=.04$, $F(2,84)=1.73$, $p>.18$ (see Figure 2). The results for analysis of subjects' global ratings of their memories therefore do not support corollary A of Hypothesis III, which predicted that recalled memories would be congruent with the contextual mood used to frame them.

To test corollary B of Hypothesis III, the independent scales of positivity and negativity of the memories were used as measurements of the dependent variable. Each scale ranged from 1 to 7, with a higher score on the positivity scale meaning a more positive affective quality of the memory, and a higher score on the negativity scale meaning a more negative affective quality. These ratings, as shown in Table 3, were given for each of the three memories recalled by subjects on the High School Memory task.

Subject ratings of each memory on each scale (happiness and sadness) were entered into a repeated-measures MANOVA with one between-subjects variable, mood condition (happy, sad, neutral) and two within-subjects variables: order in which the memory was recalled (first, second, or third memory recalled by each subject), and rating scale (positivity or negativity).



Note: Higher score indicate more positive memories; lower scores indicate more negative memories.

Figure 2. Subjects' Memory Ratings: Overall

According to corollary B of Hypothesis III, the separate ratings of positivity and negativity should obscure any underlying mood congruency of memory and mood, so a significant interaction between mood condition and rating scale should not be apparent. In addition, no effects of memory number were expected, either in interaction with the

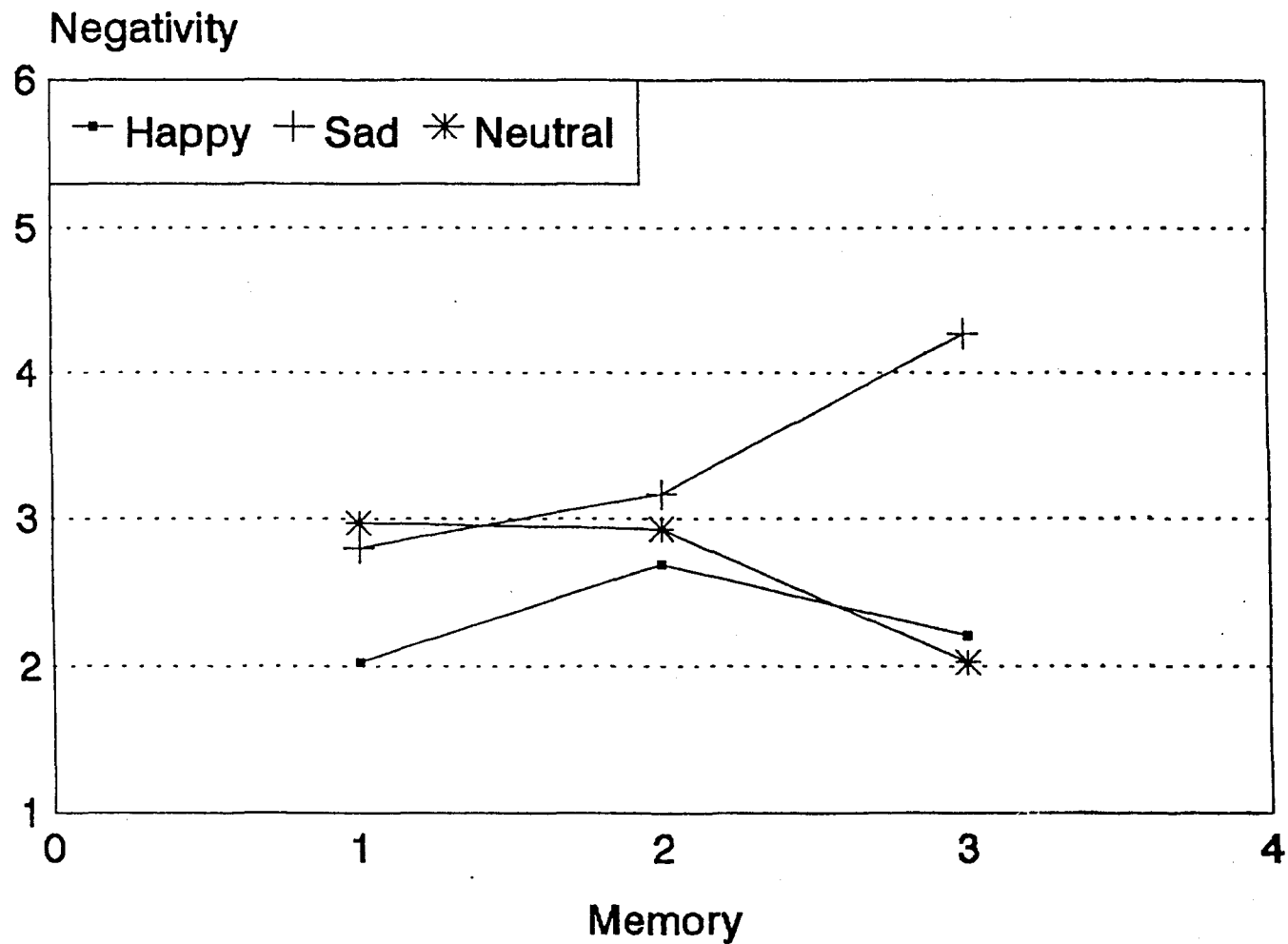
TABLE 3

SUBJECT MEMORY RATINGS:
POSITIVITY AND NEGATIVITY
MEANS (AND STANDARD DEVIATIONS)

MOOD	POSITIVITY			NEGATIVITY		
	Memory			Memory		
	1	2	3	1	2	3
Happy	5.63 (1.70)	5.17 (2.24)	5.24 (1.92)	2.03 (1.59)	2.69 (2.16)	2.21 (1.63)
Sad	4.87 (1.96)	4.63 (2.37)	3.70 (2.63)	2.80 (2.11)	3.17 (2.51)	4.27 (2.53)
Neutral	5.07 (2.23)	5.07 (2.24)	4.93 (2.26)	2.97 (2.17)	2.93 (2.93)	2.03 (3.03)

other variables or as a main effect.

This analysis showed the predicted lack of main effects or interactions involving memory number. However, an unpredicted significant interaction was found between mood condition and rating scale, $F(2,86)=3.64$, $p<.05$. To interpret this interaction, the main effects of mood condition were examined for each type of rating scale. A significant difference between mood conditions was found on the negativity



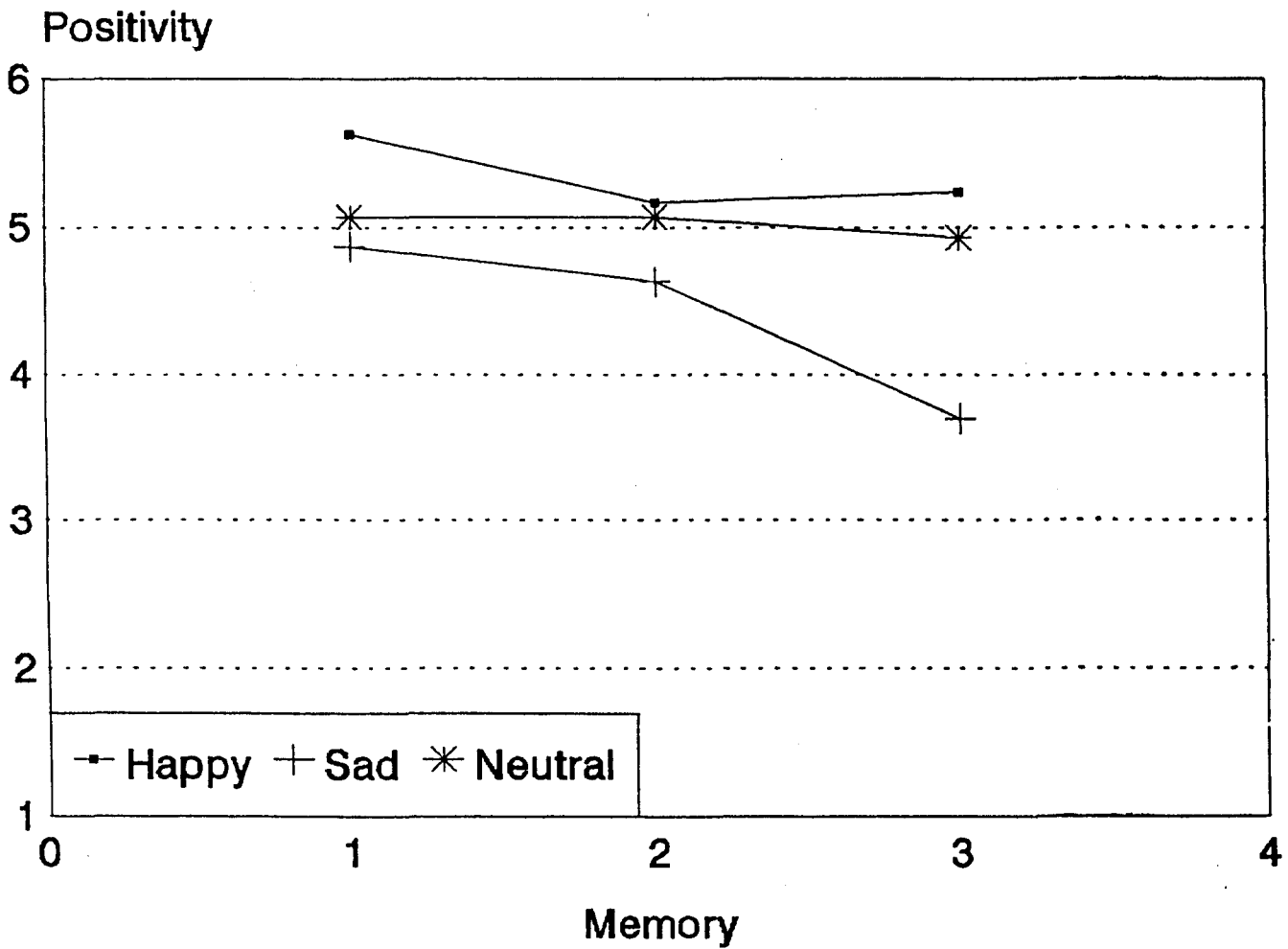
Note: Higher scores indicate more negative memories; lower scores indicate less negative memories

Figure 3. Subjects' Memory Ratings: Negativity

significance for these group differences was shown on the positivity scale, $F(2,86)=2.99$, $p<.07$ (see Figure 4).

Follow-up t -tests indicated that subjects in the happy mood condition rated their memories significantly higher on the positivity scale ($M=5.34$) than did subjects in the sad mood condition ($M=4.4$; $t(57)=2.30$, $p<.05$). Similarly, subjects in the higher mood condition rated their memories significantly lower on the negativity scale ($M=2.39$) than did subjects in the sad mood condition ($M=3.41$; $t(58)=-2.58$, $p<.05$). No differences in memory ratings on either scale were found between the happy and neutral groups or between the sad and neutral groups.

The results of the analyses on subjects' negativity and positivity memory ratings do not support corollary B of Hypothesis III, which predicted that mood congruency should not be observed when positivity and negativity were rated separately. Instead, mood congruency was observed using the isolated ratings. While differences between the MMIP groups and the neutral group were not observed, there was a consistent difference in the ratings of memories for each MMIP group, with subjects in the happy condition recalling less negative and more positive memories than subjects in the sad condition. This contrasts with the findings for subjects' global ratings of positivity/negativity of memories, suggesting that the type of scoring method used to code narrated events has had an influence on results. Further



Note: Higher scores indicate more positive memories; lower scores indicate less positive memories

Figure 4. Subjects' Memory Ratings: Positivity

implications of the differences of these findings will be addressed in the Discussion section.

Judges' Ratings

Parallel to the two forms of scoring for subject ratings of the memories, independent judges also used the two methods: a single, overall or global scale, and two independent scales. To test corollary C of Hypothesis III, scores on the global measure of positivity/negativity were examined as the dependent variable, using the ratings of two judges who used an oppositional rating method, adapted from Parrott and Sabini (1990) (see Table 4). The scale ranged from 1 to 7, with a score below the midpoint of 4 indicating a generally more negative than positive memory, and a score greater than 4 indicating a generally more positive than negative memory). In rating the memories, the judges obtained reliabilities ranging from $r=.93$ to $r=.95$, with an average reliability of $r=.94$.

The means of judges' ratings were entered into a MANOVA with one between-subject variable (happy, sad, neutral mood condition) and one within-subject variable (first, second or third memory). If corollary C of Hypothesis III is correct, the judges' extraspective, "third person" status should obscure any observance of mood congruity of memories.

As predicted, the results showed no effects for the interaction between mood condition and memory number, Hotelling's $T^2=.052$, $F(4, 170)=1.11$, $p>.35$, nor for mood

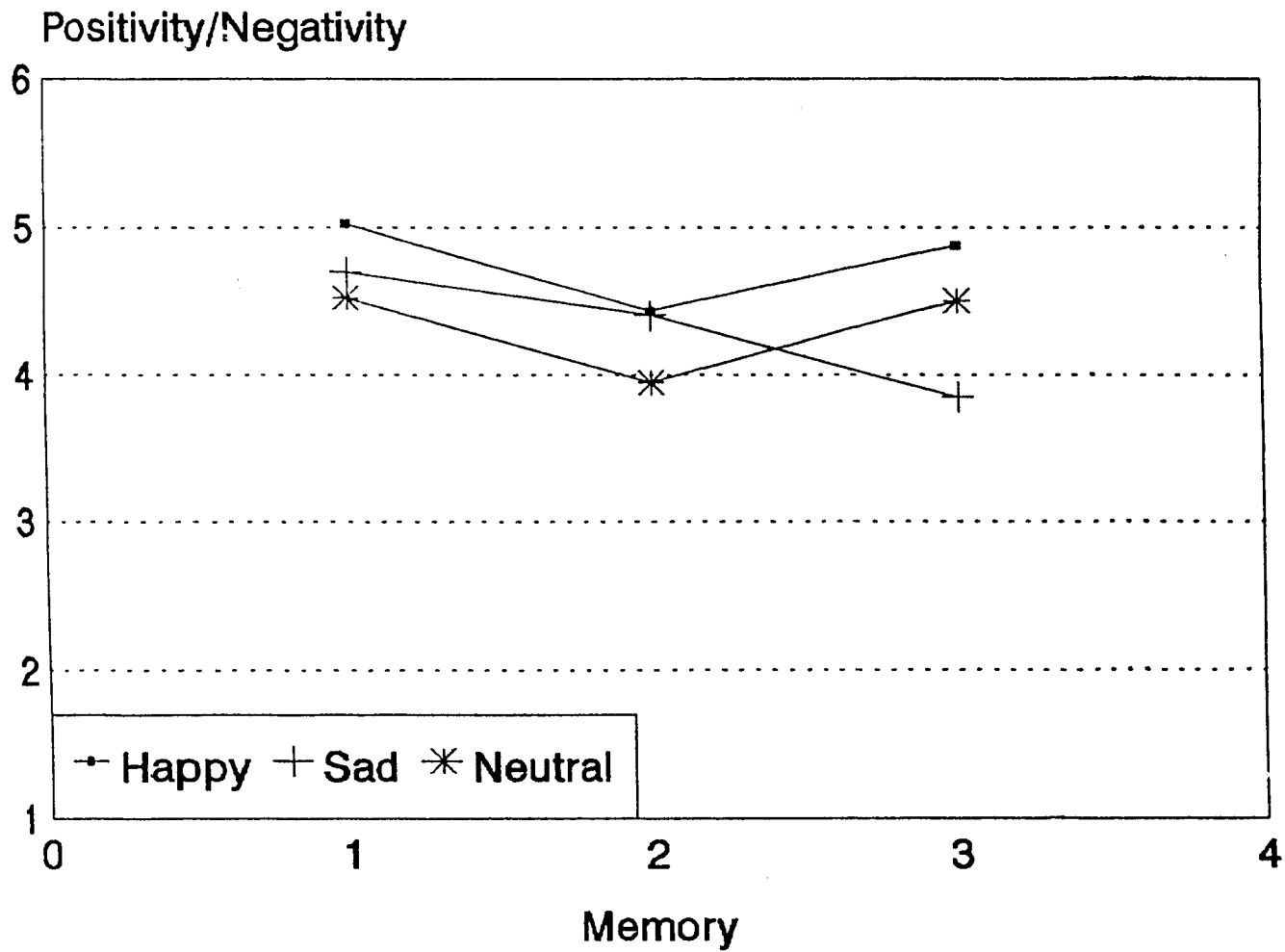
TABLE 4

JUDGES' MEMORY RATINGS:
OVERALL AFFECT
MEANS (AND STANDARD DEVIATIONS)

MOOD CONDITIONS	POSITIVITY		
	Memory		
	1	2	3
Happy	5.03 (1.23)	4.43 (1.46)	4.88 (1.56)
Sad	4.70 (1.83)	4.40 (1.83)	3.85 (2.50)
Neutral	4.52 (1.78)	3.95 (1.77)	4.50 (2.81)

condition, $F(2,87)=1.35$, $p>.26$. However, there was a trend toward significance for the effect of memory number on judges' global ratings, Hotelling's $T^2=.056$, $F(2,86)=2.44$, $p<.095$. Univariate t -tests revealed that the first memory was rated as significantly more towards the positive end of the scale than was the second memory, $t(89)=2.23$, $p<.05$. There were no significant differences between the first and third memory, $t(89)=1.34$, $p>.18$, nor between the second and third memory, $t(89)=-.63$, $p>.52$ (see Figure 5). The results for judges' overall, global ratings of the affective content of memories therefore lend support to corollary C of Hypothesis III, in that mood congruity was not observed in judges' ratings of these memories.

The final method used for testing Hypothesis III was to use judges' ratings of memories on the two separate scales of



Note: Higher scores indicate more positive memories, lower scores indicate more negative memories

Figure 5: Judges' Memory Ratings: Overall

positivity and negativity. To test corollary D of Hypothesis III, the independent scores of positivity and negativity of the memory were examined as the dependent variable, using the ratings of two judges trained in the scoring method used by Parrott and Sabini (1990) (see Table 5). Each scale ranged from 1 to 7, with a higher score on the positivity scale meaning a more positive affective quality, and a higher score on the negativity scale meaning a more negative affective quality. Reliability of scoring for these judges on the three memories ranged from $r=.77$ to $r=.89$, with the average reliability being $r=.84$.

TABLE 5

JUDGES' MEMORY RATINGS:
POSITIVITY AND NEGATIVITY,
MEANS (AND STANDARD DEVIATIONS)

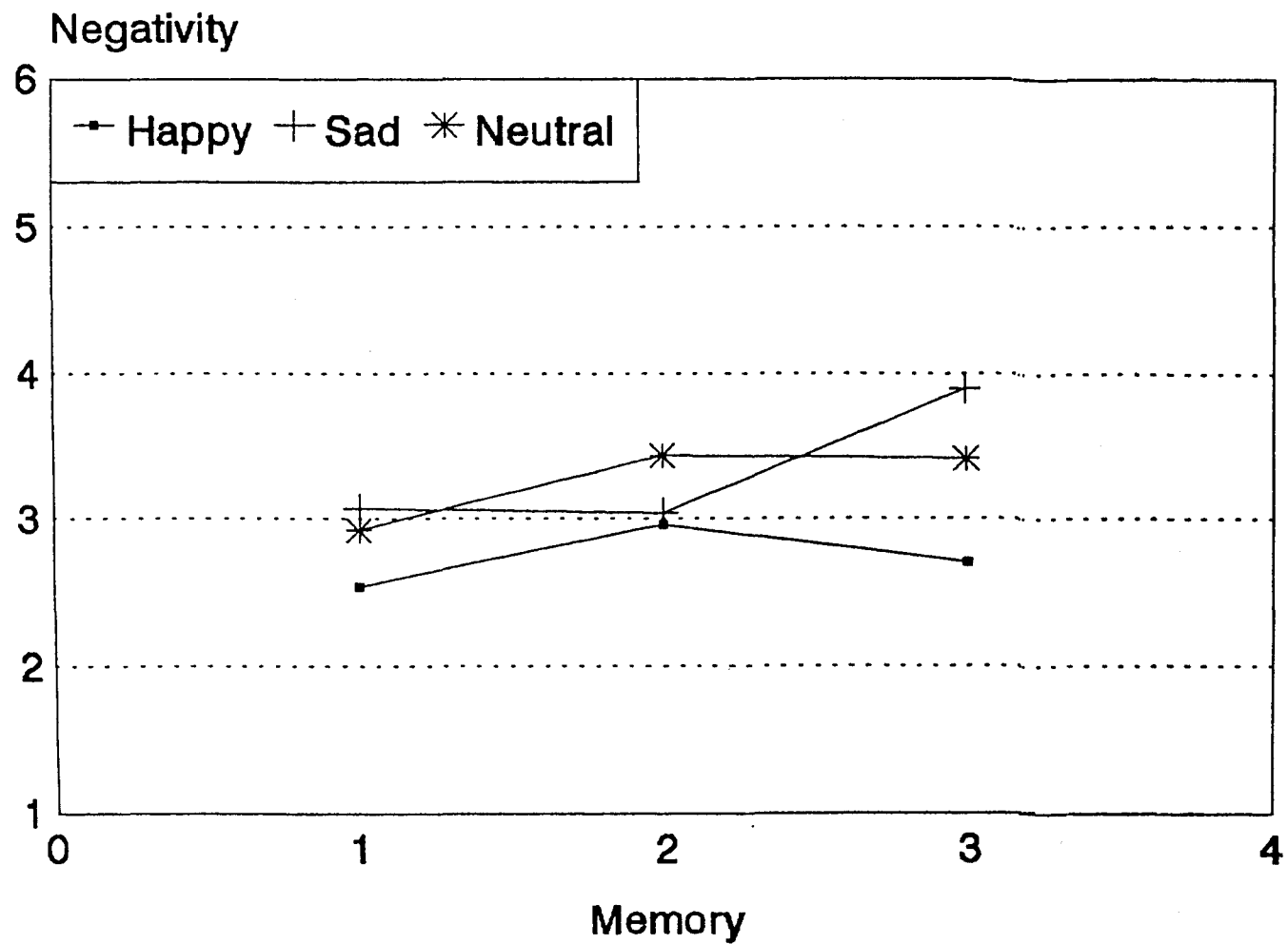
MOOD	POSITIVITY			NEGATIVITY		
	Memory			Memory		
	1	2	3	1	2	3
Happy	4.57 (1.79)	4.02 (1.92)	4.54 (1.76)	2.54 (1.60)	2.96 (1.87)	2.70 (2.11)
Sad	4.02 (1.96)	3.94 (2.09)	3.77 (2.34)	3.07 (1.94)	3.04 (1.99)	3.90 (2.37)
Neutral	4.52 (2.12)	3.46 (2.14)	4.58 (2.34)	2.92 (2.20)	3.44 (2.12)	3.42 (2.43)

Judges' ratings of each memory on each scale were entered into a repeated-measures MANOVA with one between-subjects variable, mood condition (happy, sad, neutral) and two within-

subjects variables: order in which the memory was recalled (first, second, or third memory recalled by each subject), and rating scale (positivity or negativity). According to corollary D of Hypothesis III, the judges' extraspective, "third person" status and the use of separate ratings of positivity and negativity should combine to obscure the observations of mood congruency; a significant interaction between mood condition and rating scale should not be apparent. In addition, no main or interaction effects of memory number were expected.

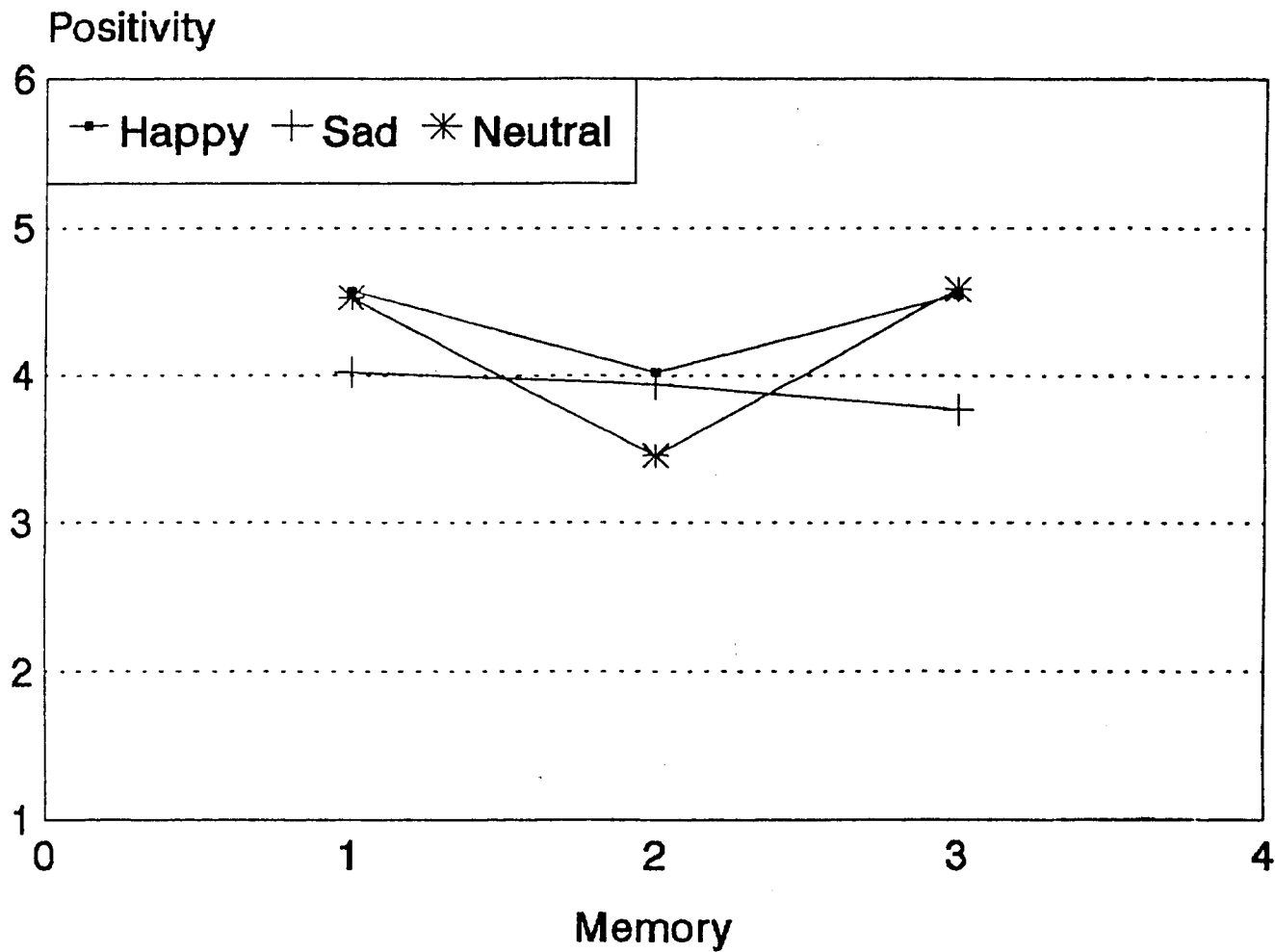
The results of this analysis showed no interaction between mood condition and rating scale, $F(2,76)=0.96$, $p>.39$. However, a significant main effect of memory number was apparent, Hotelling's $T^2=.31$, $F(2,75)=11.81$, $p<.001$. Pairwise t -tests between each memory position revealed that the first memory was rated by judges as higher on the positive scale ($M=4.39$) than the second memory ($M=3.78$; $t(79)=2.38$, $p<.05$). There was also a trend towards significance for the difference in positivity ratings seen when the second memory ($M=3.81$) was compared to the third memory ($M=4.29$, $t(78)=-1.79$, $p<.08$) with third memories tending to be more positive (see Figures 6 and 7).

The results for judges' ratings of the positivity and negativity of memories demonstrate support for corollary D of Hypothesis III, which predicted that mood congruency would not be demonstrated in judges' ratings. As in the



Note: Higher scores indicate more negative memories; lower scores indicate less negative memories.

Figure 6. Judges' Memory Ratings: Negativity



Note: Higher scores indicate more positive memories; lower scores indicate less positive memories.

Figure 7. Judges' Memory Ratings: Positivity

results for overall, global ratings of positivity/negativity, a pattern is seen in which the positivity of memories is related to the order in which it is recalled. This pattern suggests that according to external judges, subjects' first memory tends to be more positive across mood conditions, with few differences between the other memories. This was true for both overall and separate positivity/negativity ratings. Implications of these findings are taken up in the Discussion section.

Part II.

Manipulation Check

As in Part I, Hypothesis I was first tested in order to provide evidence that the experimental manipulation was effective. To find out whether happy and sad music provided a context used by subjects in evaluating their moods during the second session, the dependent variable was subjects' mood as measured by the two scales, happiness and sadness, as derived from two mood assessment measures in Part 2 (MA4 and MA5, see Table 6). Recall that a higher score on the happiness scale, which ranged from 1 to 7, indicated a happier mood for the subject, while a higher score on the sadness scale, which also ranged from 1 to 7, indicated a sadder mood.

The scale scores for happiness and sadness at each time of measurement were entered into a repeated measures MANOVA. The design had one between-subjects variable, mood condition

TABLE 6

MEANS (AND STANDARD DEVIATIONS) OF MOOD SCALES,
PART II

MOOD CONDITIONS		MOOD SCALES	
		Happiness	Sadness
Happy	Before MMIP	4.12 (1.18)	1.70 (0.86)
	After MMIP	4.43 (1.14)	1.58 (0.75)
Sad	Before MMIP	4.52 (1.29)	1.78 (1.25)
	After MMIP	1.78 (1.25)	2.30 (1.39)
Neutral	Before MMIP	3.93 (1.17)	2.18 (1.20)
	After MMIP	3.93 (1.17)	2.18 (1.20)

Note. Higher scores indicate a happier mood on the happiness scale, whereas higher scores indicate a sadder mood on the sadness measure.

(happy music, sad music, or no music) and two within-subjects variables: time of measurement (before and after the MMIP) and mood scale (happiness scale and sadness scale). Subjects who did not hear music only rated mood once (MA4) before the memory task. For these subjects, both the "before MMIP" and "after MMIP" mood ratings were considered in the following analyses to be identical to this single rating. According to Hypothesis I, a three-way interaction should occur, indicating that changes in mood ratings at different times of measurement should vary relative to the mood condition and relative to the mood scale.

As predicted, the three-way interaction of mood condition, mood scale, and time of measurement was significant, $F(2,86)=21.01$, $p<.001$. An analysis of the simple

interaction of mood condition and time of measurement, when the type of mood scale was held constant, was significant for ratings of happiness, $F(2,86)=30.74$, $p<.001$, and for ratings of sadness, $F(2,86)=8.19$, $p<.01$.

In order to test corollaries A and B of Hypothesis I, which predicted that the MMIP itself was effective in manipulating subjects' mood, the next step was to analyze the simple main effect of the time of measurement variable, when mood condition was held constant. For subjects in the sad mood condition, ratings of happiness after the sad music ($M=3.72$) were significantly lower than they had been at the beginning of the experiment ($M=4.52$; $F(1,29)=28.60$, $p<.001$), while ratings of sadness after the MMIP ($M=2.30$) were significantly higher than before the music ($M=1.78$; $F(1,29)=7.54$, $p<.05$). For subjects in the happy mood condition, ratings of happiness after the happy music ($M=4.43$) were significantly higher than they had been at the beginning of the experiment ($M=4.11$; $F(1,28)=10.08$, $p<.01$). In this group, however, ratings of sadness after the MMIP ($M=1.57$) were not significantly lower than before the happy music ($M=1.70$; $F(1,29)=.22$, $p>.64$).

As in Part I, the results of this analysis support corollaries A and B of Hypothesis I that music will be a context taken into account as subjects assess their mood: Subjects who heard happy music became more happy, while subjects who heard sad music became both less happy and more

sad. Also similar to Part I results, it seemed that the sad music appeared to be a context which was more effective for changing subjects' mood.

To address corollaries C and D of Hypothesis I, which predicted that subjects of different groups will differ in mood depending on the mood condition assigned, a second examination of the simple interaction between mood condition and time of measurement was undertaken. An analysis of the simple simple effect of mood condition at each time of measurement revealed that before the MMIP, subjects in different mood conditions were not significantly different on either happiness, $F(2,87)=1.82$, $p>.17$; or sadness, $F(2,87)=1.29$, $p>.28$. However, after the respective MMIPs, there was a trend toward significance for the difference between groups on the happiness scale, $F(2,87)=2.79$, $p<.08$; and a significant difference between groups on the sadness scale, $F(2,86)=3.38$, $p<.05$.

Follow-up t -tests showed that subjects who had heard happy music rated happiness significantly higher ($M=4.43$) than subjects hearing sad music ($M=3.72$; $t(57)=2.31$, $p<.05$). Similarly, in the happy MMIP condition, sadness was rated significantly lower ($M=1.58$) than in the sad MMIP condition ($M=2.30$; $t(57)=-2.49$, $p<.05$). Comparisons between the happy and neutral mood conditions and between the sad and neutral mood conditions revealed no significant differences on either the happiness or sadness scales.

These results are interpreted as showing that subjects who heard music in Part II of the experiment not only changed their moods in a direction consistent with the musical context, but that this change also resulted in significant differences between groups, depending on the type of music heard. Thus corollaries C and D of Hypothesis I are supported: Subjects who hearing happy music were observably more happy and less sad than subjects hearing sad music, who assessed their mood as more sad and less happy. Inspection of these means also shows that after the happy music, subjects rated themselves above the midpoint of 4 on the happiness rating scale, and below the midpoint of 4 on the sadness scale. In contrast, after the sad MMIP, subjects in the sad mood condition rated happiness below that scale's midpoint of 4, although their ratings on the sadness scale were also below the midpoint of 4. In sum, Hypothesis I is seen as being supported in Part II in its prediction that subjects use affectively-toned music as a context for assessing their mood.

Mood and Learning

Hypothesis IV, which predicted that people will better learn those items that are affectively congruent with their current mood state, was tested by using as dependent variables two learning measures independently calculated from performance scores: "percent hits" and "trials to criterion" (see Table 7). Percent hits is defined as the number of correct trials over the number of trials presented in learning

a list of trigrams. This variable could theoretically range from 0% to 100%, with a higher score indicating more accurate performance on the task. In this study, percent hits ranged from 15% to 86%. Trials to criterion is defined as the number of trials necessary for the subject to reach the criterion for learning a list of trigrams, that criterion being correctly naming all trigram pairs consecutively, twice in a row. This variable ranged in this sample from 8 to 55, with a lower score indicating faster learning of the item.

TABLE 7

TRIGRAM LEARNING:
PERCENT HITS AND TRIALS TO CRITERION,
LIKED AND DISLIKED TRIGRAMS,
MEANS (AND STANDARD DEVIATIONS)

MOOD CONDITIONS	PERCENT HITS		TRIALS TO CRITERION	
	Liked Trigrams	Disliked Trigrams	Liked Trigrams	Disliked Trigrams
Happy	57.20 (10.51)	53.00 (11.15)	58.03 (23.29)	63.87 (26.10)
Sad	56.57 (11.00)	50.23 (12.88)	59.00 (24.79)	59.37 (25.95)
Neutral	57.50 (11.98)	55.13 (9.84)	68.73 (33.00)	75.50 (37.56)

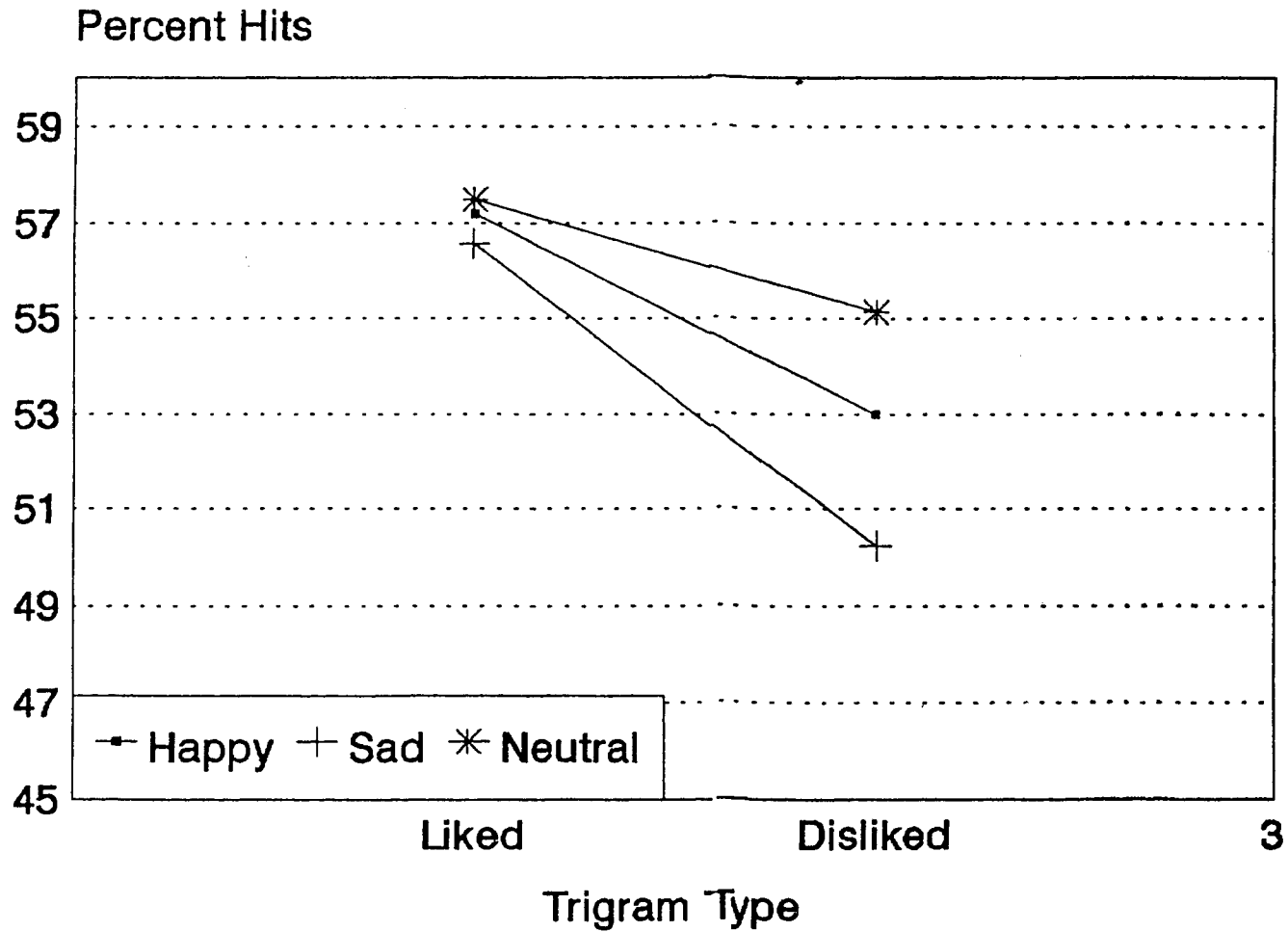
The design of the MANOVA used on these dependent variables consisted of one between-subjects variable (happy, sad, or neutral mood condition) and one within-subjects variable (liked and disliked item type). Hypothesis IV predicted an interaction between mood condition and item type,

with people in a neutral or happy mood learning liked items better, while people in a sad mood learn disliked trigrams better, as measured by both learning variables.

Contrary to the prediction of Hypothesis IV, no interaction was observed between mood condition and liked versus disliked items, Hotelling's $T^2=.077$, $F(4,170)=1.64$, $p>.17$. However, a main effect on learning was observed for item type, Hotelling's $T^2=.076$, $F(2,86)=3.28$, $p<.05$; while no effect was observed for mood alone, Hotelling's $T^2=.090$, $F(4,170)$, $p>.11$. This pattern was further observed in univariate tests for percent hits, which showed a main effect for item type, $F(1,87)=6.62$, $p<.05$; but no effects for the interaction, $F(2,87)=.47$, $p>.63$; or for mood, $F(2,87)=1.01$, $p>.36$ (see Figure 8). Similarly, univariate tests of trials to criterion showed a trend towards significance for item type, $F(1,87)=2.81$, $p<.10$, with no observed interaction effects, $F(2,97)=.60$, $p>.55$, and no main effects of mood, $F(2,87)=2.15$, $p>.12$ (see Figure 9).

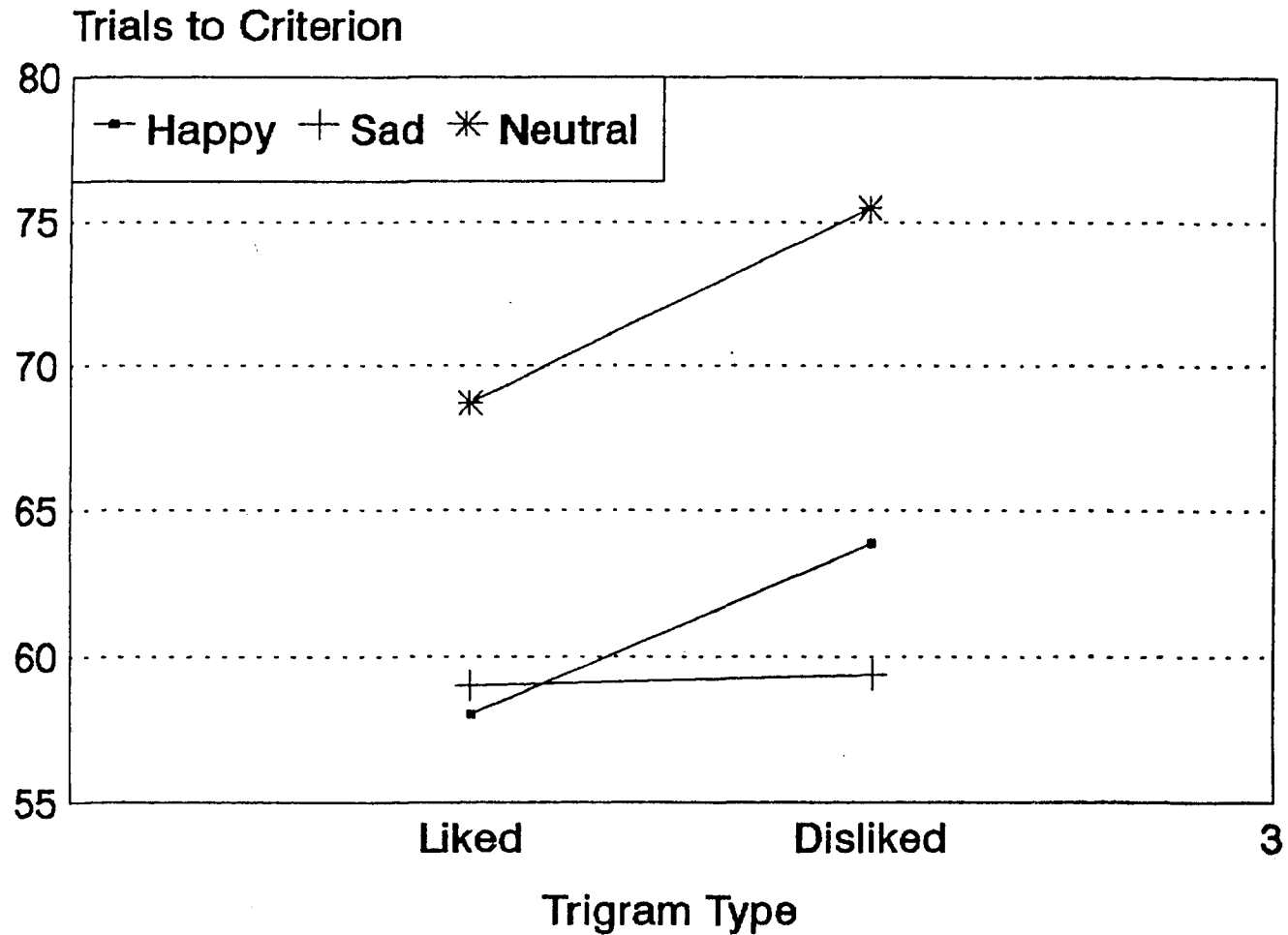
Follow-up comparisons between the means for liked versus disliked items showed that subjects had a higher percent hit rate for liked trigrams ($\bar{M}=57.1$) than for disliked trigrams ($\bar{M}=52.8$), indicating more accurate learning of liked items over disliked items. In the same pattern, subjects achieved the learning criterion in fewer trials for liked trigrams ($\bar{M}=61.9$) than for disliked trigrams ($\bar{M}=66.3$), indicating faster learning of liked items over disliked items. Thus,

Hypothesis III was not supported by these results, with the data being interpreted instead as pointing towards an overall faster and more accurate learning of liked over disliked trigrams, regardless of mood condition during learning.



Note: Higher scores indicate more accurate performance.

Figure 8. Learning Task: Percent Hits



Note: Lower scores indicate quicker learning.

Figure 9. Learning Task: Trials to Criterion

CHAPTER VI

DISCUSSION

Manipulation Checks

Support was moderate for Hypothesis I, which predicted that positively and negatively toned music would serve as a context which people use when evaluating their mood. In testing corollaries A and B of Hypothesis I, the sad MMIP appeared to be a more powerful framework for subjects' framing of their own mood. Subjects in this condition changed in their self-ratings of mood by becoming both sadder and less happy, while subjects in the happy mood condition showed a trend toward becoming more happy but did not become less sad. These results may indicate that if a person is already in a good mood, she may be less prone to employ an external context as a framework for enhancing how she is already feeling. When a different context (such as sad music) is presented, the subject may use this oppositional quality of the environment in predicating her mood.

As predicted in corollaries C and D of the hypothesis, a significant difference was observed in Part I between sad and happy mood conditions, with subjects who heard happy music rating their moods as happier and less sad than subjects who heard sad music. In addition, subjects in the sad condition

rated themselves as sadder than subjects who did not hear music, while there was a trend for happy MMIP subjects to make higher ratings of happiness compared to neutral subjects.

Similar results were found when Hypothesis I was tested for Part II of the experiment. A difference was observed in subjects' mood not only between groups, but also across time of measurement. Just as in Part I, corrolaries A and B were partially supported in that subjects who heard sad music also decreased their ratings of happiness and increased ratings of sadness, while happy subjects increased only their ratings of happiness. Thus, while the effects of the sad MMIP appeared on both happiness and sadness scales and the happy MMIP only changed scores on the happiness scale, both MMIPs appeared to be contexts used by subjects to some degree in framing their moods.

Corollaries C and D were also supported in that subjects in the happy mood condition rated their moods as happier and less sad than sad subjects. However, no differences were observed between the neutral (no music) group and the MMIP groups. This finding and the limited group differences between neutral and MMIP conditions in Part I may be evidence for a finite magnitude of the effects of music in changing mood from a moderate, neutral state to an extreme of happiness or sadness. In other words, the subjects in the MMIP groups may have changed their moods enough to be noticeably different from each other in a between-subjects comparison, and from

their own starting moods on a within-subjects comparison. Yet this change may not have been as large, or apparent at all, on a less powerful between-subjects comparison with neutral subjects.

Hypothesis II examined Parrott and Sabini's (1990) proposed explanation of mood incongruent recall suggesting that the phenomenon involved a process of mood repair. Based on LLT, it was not expected that the memories would "produce" a different mood, but that the mood would organize the memories. Therefore no differences were expected in mood as an efficient cause result of recalling positive or negative memories. This hypothesis was supported in that no differences were evident between mood before and after the memory task. It could be argued that a change in mood would only be seen if the memories were indeed incongruent with mood (see below for discussion of mood congruency results). However, if memories are considered a force which could push mood down or up like mercury in a thermometer, positive memories should further increase a happy mood, while negative memories should push mood further in a sad direction. Such a mood enhancement effect was not demonstrated. Support for Hypothesis II should not be interpreted to mean that recollection of events never influences mood; it is however, more consistent with these data to conceptualize organizing predications as the formal cause of the memory retrieval, rather than the memories as an efficient cause of mood.

Mood and Memory

The procedure in Part I was effective in leading to a difference in moods between the groups of subjects, so that Hypothesis III could be examined. This hypothesis predicted that people would recall events that are congruent in affective value with their current mood state, but only when idiographic, oppositional ratings of the positivity/negativity dimension were employed. Support for this hypothesis was mixed. Contrary to corollary A of Hypothesis III, no effects of mood group were observed when subjects used the overall, oppositional measure of positivity and negativity to rate memories. In contrast, a significant mood-congruency effect was observed when the memories were rated by subjects on independent scales of positivity and negativity, which contradicted corollary B.

Two possible explanations come to mind. The first is that, rather than obscuring the oppositional nature of positivity and negativity, the scales in which these were each addressed separately may have highlighted their oppositionality. Paying attention to the separated positive and negative affect experienced in each memory may have led subjects to acknowledge significant details that were either ignored in the global measure or "swamped" by the overriding affect of the memory.

Another possibility is that subjects actually viewed

their memories differently when they used a scale that incorporates oppositionality in its structure, as in the overall scale. While subtleties in affective judgment may be significantly different when positive and negative aspects are isolated, these differences may be less salient when the overall affect of the memory is considered.

While the oppositional nature of the positivity/negativity dimension played out differently than expected in Hypothesis III, the demonstration of mood congruency in subjects' idiographic ratings is quite consistent with LLT's conceptualization of predication as a process by which meaning is extended from a category or framework to a target. In this case, a task is presented to subjects, "recall several experiences from your high-school years," and beyond this, subjects must use their own strategies for selecting which of these memories to report. The happy or sad mood is seen by LLT as the framework used for this selection: for example, the organizing principle of a positive predication extends meaning more readily to memories that themselves are positive, in a sense bringing those memories to light by virtue of their assessed qualities. In contrast, a negative mood/predication is a category in which a memory's negative affect, as assessed by the subject, is more consistent.

On the other hand, the use of independent judges to rate memories failed to capture any significant differences for memories of subjects in happy, sad, or neutral groups, whether

two single scales or one overall scale was employed. This lack of mood congruency, which is consistent with corollaries C and D of Hypothesis III, can be interpreted in two ways. It may be that mood is not a context which subjects use as a predicated framework for recalling memories; other factors may be more important in the process of remembering experienced material. However, this conclusion would be in conflict with some of the supporting results for subjects' memory ratings.

The other explanation originally suggested by LLT is that the affective quality of a recalled experience is better judged by the experiencing subject herself than by an external observer. Independent judges who rate a memory as an isolated object may miss the personal relevance of an experience that a subject can take into account in rating the positivity/negativity of the memory, while failing to convey this information to a reader. The difference in findings depending on who decides what is positive and negative affect emphasizes that the idiographic approach advocated by LLT can identify processes that otherwise go unnoticed.

An unexpected effect was observed in memory ratings of judges in that differences were found in the ratings of the memory depending on the order in which it was recalled. These differences were significant when one pair of judges made independent ratings of positivity and negativity, while there was a trend towards significance when another pair of judges

used a global measure of positivity/negativity. Further examination revealed that the main source of the order effect was, in both cases, a tendency for the first memory recalled to be more positively rated than the second in all groups. While this effect is not addressed by any of this thesis' hypotheses, LLT could explain the observation as the result of a naturally positive predication that subjects make when approaching any new task or target. This would enhance the effects of a predication based on positive mood, and might counter the negative extension of meaning that comes from a sad mood or predication. Thus, in recalling memories, subjects may, at least initially, continue to use a positive background framework that is even more basic than that which they take on in their affective mood state.

Mood and Learning

Part II of the thesis addressed Hypothesis IV, which predicted that people would better learn those items that are affectively congruent (as individually assessed) with their current mood state. This hypothesis was not supported by the results, which showed no interaction between mood condition and item type to predict learning. Instead, subjects in all three groups tended to learned liked trigrams more accurately and more quickly than disliked trigrams. Such a "positive affective assessment effect" has been found in many other LLT studies of learning and is therefore consistent with research on learning in normal people with positive views of themselves

and the task they perform. Yet, the hypothesis was based on the prediction that positive or negative predication of context will facilitate learning of items that have been affectively assessed as congruent with that background framework. Why was this effect not observed?

Several explanations can be considered. The interpretation most oppositional to LLT would be that predication was not operating during the task, rather; other influences such as familiarity took effect. For example, liked trigrams may have been more recognizable or more wordlike by most subjects and therefore more easily learned. However, this explanation fails to take into the account the research discussed in the above review of LLT, in which better learning of positively affectively assessed material has been shown to be independent of such factors as the number of associations to or wordlikeness of the items. The explanations of these results should be considered in light of previous research as well.

There is also the possibility that positive or negative mood as a context/predication was not applied by subjects to the targeted items to be learned. While Hypothesis IV presumed subjects would use mood as a relevant framework for organizing the learning process, subjects may have felt their participation in the learning task to be more unrelated to their current mood. The procedure itself, particularly the the playing of happy or sad music throughout the learning

task, may have added to this separation between predications relevant to mood and those related to learning. Music was intended to provide a consistent context in which mood would be evaluated. In contrast, the MMIPs may have also been distracting enough that, in order to complete the challenging learning task, subjects found it helpful to ignore the music purposively, at the same time ignoring the affective evaluation and mood that they experienced in that musical context.

For example, a subject in a negative mood may think to herself, "I really hate this music, or I feel really rotten, but I have to ignore that stuff and get down to business here and get these trigrams into my head." Whether or not this attitude is conscious, if such a concentration on learning and lack of attention to music and mood occurred, mood may not have been a context or organization used in predicating the items to be learned. This interpretation is consistent with research which shows that merely asking subjects to take on a given predication does not guarantee that they will actually do so (Rychlak, 1974). In this case, suggesting a mood (via music) may not have brought subjects to employ that particular predication in the learning task.

A final explanation is suggested by the consistency of these results with other LLT research on learning in normal subjects, in which positive items were learned more easily when subjects had generally positive predications of

themselves and their environment. It may be that most subjects in this experiment did indeed have more positive than negative predications of the situation they were in, thus leading to better learning of positive trigrams. This would suggest that even though there were differences in happiness and sadness between the assigned mood conditions, the actual mood of the subjects that was used to frame learning may have been generally positive. In fact, this "after the fact" explanation is supported by an examination of the means on mood measures for Part II, especially for subjects in the sad mood condition. Even though the sad MMIP was effective in decreasing happiness and increasing sadness of these subjects, the average final mood state was more happy than sad. In addition, even though these subjects were less happy and more sad than happy subjects, the generally positive affective assessment of mood may have been the basis for a positive predication of the task. In other words, most subjects, despite their assigned group, may have had positive predications going into the task, which facilitated the learning of positively assessed items.

The latter explanation leads to possibilities for further LLT-based research in the area of mood and learning. The results of this study support the use of affectively-toned music as a context which subjects can use as an organizing principle for evaluating mood. However, the individual subject may evaluate this context in varying degrees of

positive or negative affect. Future studies may assign subjects to mood conditions after the intervention, based on individuals' actual mood ratings, rather than randomly assigning subjects to experimental conditions and obtaining mean mood ratings for each group as a whole. Thus, researchers could examine the learning of subjects who are actually happy or sad to see what, if any, effects these predications have on the process.

Conclusions

The results and interpretations of this thesis address several issues in the mood and memory field. First of all, the results of Part I of the experiment do not cross-validate Parrott and Sabini's (1990) findings of mood-incongruent recall. In fact, the results indicate a mood congruency phenomenon, which occur only when subjects, not independent judges, evaluated their memories. The exclusive use of non-participant judges of affective quality may be problematic, in that significant differences in individuals' memories may be missed, or possibly attributed where none exist in the experience of the subjects themselves. The use of external judges in experimental studies may be common, but the third-person perspective of "the other" may add an aspect of artificiality to data which may explain the inconsistency of mood-incongruency findings in Parrott and Sabini's work (1990). As stressed by LLT, inclusion of an idiographic or introspective, personal assessment of events by subjects seems

to be an important, perhaps necessary, element of the design of such studies.

The phenomenon of mood congruent recall has been observed in many studies which have used Bower's (1981) NNTA as an explanatory theory. Indeed, NNTA would predict mood congruent recall of memories in the procedure used in this thesis, in that activation of happy or sad nodes would spread to activation of events associatively linked to those nodes. However, as pointed out in the review of research on NNTA, there has been a failure to demonstrate consistently the effectiveness of mood as an associative "trigger" for recall of linked items, as in the phenomenon of mood-dependent recall. This has cast doubt on the explanatory power of a purely material/efficient cause theory in addressing the complex nature of human memory.

The first part of this thesis demonstrates that Logical Learning Theory, whose formal/final cause emphasis is fundamentally different from the nodal network theory of affect, can also effectively account for the observations of mood congruent recall by focusing on the evaluative, predicating aspects of cognition. In addition, the second part of the thesis begins to explore how mood can be viewed from an LLT standpoint as a formal cause pattern which predicates actual learning itself, a process perhaps more basic than recall of learned or remembered material. As the formal and final cause emphasis of LLT begin to contribute to

the understanding of mood congruent recall, further research using LLTs predictions to examine this phenomenon, as well as the concept of mood-dependent recall, could continue to be productive. Other topics in the field of mood and memory may also benefit from the alternative hypotheses and explanations offered by Logical Learning Theory's introspective, teleological view of affect.

REFERENCES

- Abramson, Y. (1967). Reinforcement value: An idiographic approach to meaningfulness. Unpublished doctoral dissertation. St. Louis: St. Louis University.
- Abramson, Y., Tasto, D.L., & Rychlak, J.F. (1969). Nomothetic vs. idiographic influences of association value and reinforcement value on learning. Journal of Experimental Research in Personality, 4, 65-71.
- Adler, A. (1930). "Individual psychology." In H.L. Ansbacher and R.R. Ansbacher, (Eds.) The Individual Psychology of Alfred Adler, New York: Harper & Row.
- Alexander, L., & Guenther, R.K. (1986). The effect of mood and demand on memory. British Journal of Psychology, 77, 343-350.
- Allport, G.W. (1955). Becoming: Basic considerations for a psychology of personality. New Haven, CT: Yale University Press.
- Archer, E.J. (1960). Re-evaluation of the meaningfulness of all possible CVC trigrams. Psychological Monographs, 74, (10, Whole No. 497).
- August, G.J., & Rychlak, J.F. (1978). Role of intelligence and task difficulty in the affective learning styles of children. Journal of Educational Psychology, 70, 406-413.
- August, G.J., Rychlak, J.F., & Felker, D.W. (1975). Affective assessment, self-concept, and the verbal learning styles of fifth-grade children. Journal of Educational Psychology, 67, 801-806.
- Bartlett, J.C., Burleson, G., & Santrock, J. W. (1982). Emotional mood and memory in young children. Journal of Experimental Child Psychology, 34, 59-76.
- Blaney, P.H. (1986). Affect and memory: A review. Psychological Bulletin, 99(2), 229-246.
- Bower, G.H. (1981). Mood and memory. American Psychologist,

36, 129-148.

- Bower, G.H. (1987). Commentary on mood and memory. Behavior Research and Therapy, 25, 443-455.
- Bower, G.H., & Mayer, J.D. (1989). In search of mood-dependent retrieval. Journal of Social Behavior and Personality, 4(2), 121-156.
- Bower, G.H., & Mayer, J.D. (1985). Failure to replicate mood-dependent retrieval. Bulletin of the Psychonomic Society, 23, 39-42.
- Bower, G.H., Monteiro, K.P., & Gilligan, S.G. (1978). Emotional mood as a context for learning and recall. Journal of Verbal Learning and Verbal Behavior, 17, 573-585.
- Brickman, P., Redfield, J., Harrison, A.A., & Crandall, R. (1972). Drive and predisposition as factors in the attitudinal effects of pure exposure. Journal of Experimental Social Psychology, 8, 31-34.
- Brown, J.D. & Taylor, S.E. (1986). Affect and the processing of personal information: Evidence for mood-activated self-schemata. Journal of Experimental Social Psychology, 22, 436-452.
- Caprara, G., Spizzichino, C., & Romeo, C. (1989). Trait congruence in the study of the cognitive consequences of emotional arousal. European Journal of Personality, 3, 285-298.
- Clark, D.M., & Teasdale, J.D. (1985). Constraints on the effects of mood on memory. Journal of Personality and Social Psychology, 48, 1595-1608.
- Collins, A.M., & Loftus, E.M. (1975). A spreading-activation theory of semantic processing. Psychological Review, 82, 407-428.
- Eich, E., & Metcalfe, J. (1989). Mood dependent memory for internal versus external events. Journal of Experimental Psychology: Learning, Memory, and Cognition, 15, 443-455.
- Ehrlichman, H. & Halpern, J.N. (1988). Affect and memory: Effects of pleasant and unpleasant odors on retrieval of happy and unhappy memories. Journal of Personality and Social Psychology, 55, 769-779.
- Eysenck, M.W., & Keane, M.T. (1990). Cognitive psychology: A

student's handbook. Hillsdale, USA: Lawrence Erlbaum Associates.

- Isen, A.M., Shalker, T.E., Clark, M., & Karp, L. (1978). Affect, accessibility of material in memory, and behavior: A cognitive loop? Journal of Personality and Social Psychology, 36, 1-12.
- Isen, A.M. (1984). Toward understanding the role of affect in cognition. In K. Wyer & T. Small (Eds.) Handbook of Social Cognition, Hillsdale, NJ: Erlbaum.
- Isen, A.M. (1985). Asymmetry of happiness and sadness in effects on memory in normal college students: Comment on Hasher, Rose, Zacks, Sanft, and Doren. Journal of Experimental Psychology: General, 114, 388-341.
- Kelly, G.A. (1963). A theory of personality: The psychology of personal constructs. New York, NY: W.W. Norton and Co.
- Kubat, W.J. (1969). The reinforcement value of associations made to CVC trigrams. Unpublished master's thesis. St. Louis: St Louis University, 1969.
- Laberteaux, T.E. (1968). The influence of positive versus negative reinforcement value on mediated paired-associate learning. Unpublished master's thesis. St. Louis: St. Louis University, 1968.
- Lazarus, R.S. (1984). On the primacy of cognition. American Psychologist, 39, 123-135.
- Lewis, V.E., & Williams, R.N. (1989). Mood-congruent versus mood-state-dependent learning: Implications from a view of emotion. Journal of Social Behavior and Personality, 4, 157-171.
- MacLeod, C., Tata, P., & Mathews, A. (1987). Perception of emotionally valenced information in depression. British Journal of Clinical Psychology, 26, 67-68.
- Matlin, M., & Stang, D. (1978). The Pollyanna principle: Selectivity in language, memory, and thought. Cambridge, Mass.: Schenkman.
- Mayer, J.D., & Bower, G.H. (1985). Mood-dependent retrieval: Commentary on Wetzler. Psychological Reports, 57, 1000-1002.
- Mecklenbrauker, S., & Hager, W. (1984). Effects of mood on memory: Experimental tests of a mood-state-dependent retrieval hypothesis and of a mood-congruity hypothesis.

Psychological Research, 46, 355-376.

Mosbacher, B.J. (1984). Depression and alcohol ingestion: A teleological perspective. Unpublished doctoral dissertation. West Lafayette, Ind.: Purdue University, 1984.

Natale, M., & Hantas, M. (1982). Effect of temporary mood states on selective memory about the self. Journal of Personality and Social Psychology, 42, 927-934.

Parrott, W.G., & Sabini, J. (1990). Mood and memory under natural conditions: Evidence for mood incongruent recall. Journal of Personality and Social Psychology, 59, 321-336.

Rinck, M., Glowalla, U., & Schneider, K. (1992). Mood-congruent and mood-incongruent learning. Memory and Cognition, 20(1), 29-39.

Rychlak, J.F. (1988) The psychology of rigorous humanism. New York: New York University Press.

Rychlak, J.F., Carlsen, N.L. & Dunning, L.P. (1974). Personal adjustment and the free recall of material with affectively positive or negative meaningfulness. Journal of Abnormal Psychology, 83, 480-487.

Rychlak, J.F., Flynn, E.J., & Burger, G. (1979). Affection and evaluation as logical processes of meaningfulness independent of associative frequency. Journal of General Psychology, 100, 143-157.

Rychlak, J.F., & Marceil, J.C. (1986). Task predication and affective learning style. Journal of Social Behavior and Personality, 1, 557-564.

Rychlak, J.F., McKee, D.B., Schneider, W.E., & Abramson, Y. (1971). Affective evaluation in the verbal learning styles of normals and abnormals. Journal of Abnormal Psychology, 77, 11-16.

Singer, J.A., & Salovey, P. (1988). Mood and memory: Evaluating the network theory of affect. Clinical Psychology Review, 8, 211-251.

Skinner, B.F. (1974). About Behaviorism. New York: Random House.

Small, S.A. (1985). The effect of mood on word recognition. Bulletin of the Psychonomic Society, 23(6), 453-455.

- Small, S.A., & Robins, C.J. (1988). The influence of induced depressed mood on visual recognition thresholds: Predictive ambiguity of associative network models of mood and cognition. Cognitive Therapy and Research, 12(3), 295-304.
- Teasdale, J.D., & Fogarty, S.J. (1979). Differential effects of induced mood on retrieval of pleasant and unpleasant events from episodic memory. Journal of Abnormal Psychology, 88(3), 248-257.
- Teasdale, J.D., & Russell, M.L. (1983). Differential effects of induced mood on the recall of positive, negative, and neutral words. British Journal of Clinical Psychology, 22, 163-171.
- Teasdale, J.D., & Taylor, R. (1981). Induced mood and accessibility of memories: An effect of mood state or of induction procedure? British Journal of Clinical Psychology, 20, 39-48.
- Ucros, C.G. (1989). Mood state-dependent memory: A Meta-analysis. Cognition and Emotion, 3(2), 139-167.
- Velten, E. (1968). A laboratory task for the induction of mood states. Behavior Research and Therapy, 6, 473-482.
- Wetzler, S. (1985). Mood state-dependent retrieval: A failure to replicate. Psychological Reports, 56, 759-765.
- Zajonc, R.B. (1968). Attitudinal effects of mere exposure. Journal of Personality and Social Psychology Monograph Supplements, 9, (2, Part 2).
- Zajonc, R.B. (1984). On the primacy of affect. American Psychologist, 39, 117-123.

APPENDICES

APPENDIX A

Music Selections

"Happy" Program (all played at full speed)

- *1. That Da-Da Strain (2:15)
- *2. That's A Plenty (3:14)
- *3. W & L Swing (3:49)
- *4. Limehouse Blues (2:48)
- *5. Original Dixieland One Step (2:52)
- 6. Prelude and La Garde Montante from Bizet's Carmen (5:02)
- 7. Dvorak's Slavonic Dances, Numbers 1, 5, and 6 (18:05)
- 8. Selections from "The Entertainer:" The Glove, Little Girl, Pineapple Rag, The Entertainer, Easy Winners (11:35)
- 9. Claude Bolling's Suite for Flute and Jazz Piano (excerpts; 12:55)

"Sad" Program

- *1. Shostakovich's 15th Symphony, 2nd Movement (excerpt, played at 2/3 speed; 5:27)
- *2. "Russia Under the Mongolian Yoke" from Prokofiev's Alexander Nevsky (played at 1/2 speed; 5:38)
- *3. Tchaikovsky's 6th Symphony, 4th movement (ending, played at 2/3 speed; 3:56)
- 4. Mahler's 5th Symphony, 4th movement (11:33)
- 5. Tchaikovsky's 6th Symphony, 4th movement (beginning; 10:00)
- 6. Beethoven's Egmont Overture (excerpt; 2:24)
- 7. Prokofiev's Romeo and Juliet (excerpt; 3:35)
- 8. Wagner's Prelude and Liebestod (12:15)

*Starred selections provided by W.G. Parrott via personal correspondence, February 6, 1991.

APPENDIX B

Mood Assessment (MA)

1. At this moment, how cheerful do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
2. At this moment, how anxious do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
3. At this moment, how sad do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
4. At this moment, how confused do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
5. At this moment, how depressed do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
6. At this moment, how apprehensive do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
7. At this moment, how happy do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
8. At this moment, how uncertain do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
9. At this moment, how hopeless do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7
10. At this moment, how fearful do you feel?						
not at all			moderately			very
1	2	3	4	5	6	7

11. At this moment, how lighthearted do you feel?
not at all moderately

not at all

moderately

very

1

2

3

4

5

6

7

Scale Items for Mood Assessment

Happy: 1, 7, 11

Anxious: 2,6,10

Sad: 3, 5, 9

Uncertain: 4,8

APPENDIX C

High School Memory Task (HSM)

At this time, try to remember three specific events that happened to you during your high school years. Write down a brief description of the first three memories that come to your mind, in the order they occur to you. After each memory write how you felt about the event at the time. Your responses will be kept strictly confidential.

1. Event:

How did you feel about this event?

2. Event:

How did you feel about this event?

3. Event:

How did you feel about this event?

APPENDIX D

Subject Rating Scale: Positive

HSI-P

On a scale of 1 to 7, please rate each memory according to how positive it was for you.

Event 1.

not at all positive				moderately positive			very positive
1	2	3	4	5	6	7	

Event 2.

not at all positive				moderately positive			very positive
1	2	3	4	5	6	7	

Event 3.

not at all positive				moderately positive			very positive
1	2	3	4	5	6	7	

APPENDIX E

Subject Rating Scale: Negative

HSI-N

On a scale of 1 to 7, please rate each memory according to how negative it was for you.

Event 1.

not at all negative			moderately negative			very negative
1	2	3	4	5	6	7

Event 2.

not at all negative			moderately negative			very negative
1	2	3	4	5	6	7

Event 3.

not at all negative			moderately negative			very negative
1	2	3	4	5	6	7

APPENDIX F

Subject Rating Scale: General

HSI-G

On a scale of 1 to 7, please rate each memory according to how negative or positive it was for you as a whole.

Event 1.

very negative							very positive
1	2	3	4	5	6		7

Event 2.

very negative							very positive
1	2	3	4	5	6		7

Event 3.

very negative							very positive
1	2	3	4	5	6		7

APPENDIX G

Phonetic Preference Inventory (PPI)

Name: _____ Age: _____ Sex: _____

This is a test of letter-combination preference. It consists of 140 syllable-like "trigrams" composed of differing letter combinations. You are to look at each one of the trigrams and then place an "X" to indicate whether you like or dislike the trigram. Read it "aloud" to yourself and then decide on the basis of how you "feel" about it.

There are no right or wrong answers in the usual sense, because all answers are equally good. While there is no time limit on this test, you should not linger over any of the trigrams nor try to analyze why you like or dislike them. Just look at each trigram and place an "X" in the appropriate space below to indicate whether you:

- (LM) like the trigram much
- (LS) like the trigram slightly
- (DS) dislike the trigram slightly
- (DM) dislike the trigram much

Remember, no matter how slight your feeling may be, every trigram must be marked to indicate whether you like or dislike it.

<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)	<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)
1. JOR	()	()	()	()	11. FAP	()	()	()	()
2. RAJ	()	()	()	()	12. HIB	()	()	()	()
3. WYR	()	()	()	()	13. BEH	()	()	()	()
4. YIR	()	()	()	()	14. DEH	()	()	()	()
5. YOC	()	()	()	()	15. DYX	()	()	()	()
6. RYF	()	()	()	()	16. GOZ	()	()	()	()
7. RYK	()	()	()	()	17. JOX	()	()	()	()
8. SEQ	()	()	()	()	18. MOY	()	()	()	()
9. NUJ	()	()	()	()	19. PEM	()	()	()	()
10. PIV	()	()	()	()	20. QIC	()	()	()	()

<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)	<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)
21. WOB	()	()	()	()	44. KOS	()	()	()	()
22. WYM	()	()	()	()	45. KUN	()	()	()	()
23. YUH	()	()	()	()	46. CAG	()	()	()	()
24. CYK	()	()	()	()	47. FIL	()	()	()	()
25. DYS	()	()	()	()	48. FYX	()	()	()	()
26. HUZ	()	()	()	()	49. FAZ	()	()	()	()
27. KEV	()	()	()	()	50. HOZ	()	()	()	()
28. LIG	()	()	()	()	51. JUM	()	()	()	()
29. LIX	()	()	()	()	52. MUV	()	()	()	()
30. NEP	()	()	()	()	53. NAS	()	()	()	()
31. TYD	()	()	()	()	54. PIQ	()	()	()	()
32. VOX	()	()	()	()	55. SYK	()	()	()	()
33. YAT	()	()	()	()	56. WYT	()	()	()	()
34. BYK	()	()	()	()	57. ZEL	()	()	()	()
35. GUC	()	()	()	()	58. HYT	()	()	()	()
36. RYN	()	()	()	()	59. JOD	()	()	()	()
37. SOV	()	()	()	()	60. TUS	()	()	()	()
38. WEV	()	()	()	()	61. WUD	()	()	()	()
39. YEZ	()	()	()	()	62. JAV	()	()	()	()
40. LUT	()	()	()	()	63. LYM	()	()	()	()
41. NUP	()	()	()	()	64. PEB	()	()	()	()
42. PID	()	()	()	()	65. PYC	()	()	()	()
43. GAW	()	()	()	()	66. WEG	()	()	()	()

<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)	<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)
67. WYP	()	()	()	()	90. PYG	()	()	()	()
68. BYN	()	()	()	()	91. KYT	()	()	()	()
69. DYP	()	()	()	()	92. TOX	()	()	()	()
70. TYC	()	()	()	()	93. VOG	()	()	()	()
71. ZAC	()	()	()	()	94. WID	()	()	()	()
72. FAV	()	()	()	()	95. WOK	()	()	()	()
73. MOH	()	()	()	()	96. LEP	()	()	()	()
74. NAL	()	()	()	()	97. LOD	()	()	()	()
75. PIF	()	()	()	()	98. LOM	()	()	()	()
76. PIM	()	()	()	()	99. KEM	()	()	()	()
77. BEP	()	()	()	()	100. KIR	()	()	()	()
78. BYT	()	()	()	()	101. KOC	()	()	()	()
79. JEP	()	()	()	()	102. KYD	()	()	()	()
80. RIS	()	()	()	()	103. SYP	()	()	()	()
81. RIX	()	()	()	()	104. KEL	()	()	()	()
82. TOX	()	()	()	()	105. SYP	()	()	()	()
83. VIL	()	()	()	()	106. VIR	()	()	()	()
84. WAH	()	()	()	()	107. GES	()	()	()	()
85. WAQ	()	()	()	()	108. PIZ	()	()	()	()
86. WOF	()	()	()	()	109. QIT	()	()	()	()
87. GOF	()	()	()	()	110. RYD	()	()	()	()
88. NYC	()	()	()	()	111. NUG	()	()	()	()
89. PAB	()	()	()	()	112. TOB	()	()	()	()

<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)	<u>Syllable</u>	(LM)	(LS)	(DS)	(DM)
113. KAS	()	()	()	()	127. BIF	()	()	()	()
114. DUR	()	()	()	()	128. JUS	()	()	()	()
115. DAF	()	()	()	()	129. KER	()	()	()	()
116. DUP	()	()	()	()	130. RES	()	()	()	()
117. HEK	()	()	()	()	131. VAS	()	()	()	()
118. MAJ	()	()	()	()	132. LAR	()	()	()	()
119. NAK	()	()	()	()	133. MAH	()	()	()	()
120. PAG	()	()	()	()	134. YAW	()	()	()	()
121. SIB	()	()	()	()	135. CAV	()	()	()	()
122. CAY	()	()	()	()	136. FAC	()	()	()	()
123. COZ	()	()	()	()	137. GAV	()	()	()	()
124. VIK	()	()	()	()	138. RYM	()	()	()	()
125. FIV	()	()	()	()	139. YEH	()	()	()	()
126. BEY	()	()	()	()	140. BIZ	()	()	()	()

APPENDIX H

Music Rating Inventory/Auditory Stimulus Rating (MRI/ASR)

1. Did any of this music sound familiar to you? ____yes ____no
If yes, please list any names of pieces you can recognize.

2. How loud did this music sound to you?

very
soft

1

2

3

4

5

6

very
loud

7

3. How much did you like this music?

disliked

much

1

2

3

4

5

6

liked

much

7

4. Did this music elicit any emotions for you? Please list
and rate:

Emotion: _____

Felt
weakly

1

2

3

4

5

6

Felt
strongly

7

Emotion: _____

Felt
weakly

1

2

3

4

5

6

Felt
strongly

7

Emotion: _____

Felt
weakly

1

2

3

4

5

6

Felt
strongly

7

5. How distracting was the music while you were doing the
other tasks?

not
distracting

1

2

3

4

5

6

very
distracting

7

Score Sheet

SUBJECT

TRIALS

Liked CVCs

2	0	2	4
3	5	3	7
5	7	7	3
8	6	1	8

Disliked CVCs:

1	3	4	5
4	4	8	6
6	2	6	1
7	1	5	2

Liked List:

Disliked 11st:

APPENDIX J

Directions for Subjects

(Parenthetical statements for music conditions) [Bracketed statements for no music condition]

Part I

Hi! My name is MW, and I'd like to thank you for agreeing to participate in this experiment. Actually we'll be doing several things in this session. (The present experiment involves listening to some music which you will evaluate after a delay period. During the delay, you will be performing a number of filler tasks to ensure that everyone engages in similar activities during that delay.) (These) [Today's] tasks will be gathering information for (other) [several] research projects (unrelated to the present experiment), and will involve rating trigrams and recalling memories. (After these tasks, you will be rating the auditory stimuli.) Then, tomorrow we will be continuing part of what we begin today.

Before we begin, I want you to understand that all the data we collect will be kept anonymous and confidential. You will only be identified by a number on the packet you receive, so please do not put your name or any other identifying information on any of these forms. If for some reason you need to discontinue the experiment, you can let me know and do so without penalty. To spell all this out for you, here is a consent form which I'd like to read carefully and sign. {Consent form is distributed, signed, and recollected.}

To begin, I have a sheet here which I'd like you to fill out to let me know how you are feeling right now. (MA1 is distributed).

(As you listen to this music I'll be playing for you, please refrain from talking so that each person can listen to and experience the music as fully and deeply as possible. Do not think about judgments of the music at this time, but just sit back and make yourself comfortable, and experience the music as it plays. I'll be playing the music for about 8 minutes, and then we'll begin the filler tasks. {Music is played for 8 minutes.})

Here is a packet which I would like you to fill out.

Please complete each form as it is presented; most of the directions are self explanatory, but if you have any questions, please let me know. The loose sheet is to be used when you come to the section in which it is placed, and it may be confusing, so please ask if you have any questions. {Packets are distributed}.

{Upon completion of packet, HSI-G and ASR are distributed along with detached HSM form, with the instructions:} Here are the last two things for you to do. I'm giving you your memory sheet to refer to if you need to.

{Upon completion of these forms, subject's second day appointment is confirmed, and subject is told to expect an individualized session}

Part II

As I mentioned yesterday, this is an individualized session; we'll be doing some things we can only do one person at a time. As I also mentioned there are several experiments going on in these two sessions. (The first experiment involves evaluation of auditory stimuli, and during the delay period you are asked to do other tasks to assure that all subjects participate in the same activity during the delay. Today you will be hearing music again, and the other) [Today's] task involves a learning experiment, which I will explain to you in just a little bit. First, I would like you to fill this out for me to indicate how you feel right now. {MA4 is administered.}

(Next I would like you to listen to the music I'll be playing for you on this tape. Please do not think about evaluation of the music at this time, but allow yourself to experience it as fully and deeply as possible. This time I will be leaving the room for about 8 minutes, and when I come back we'll begin the learning experiment.)

({Experimenter begins music, leaves room and returns in 8 minutes. MA5 is administered with the directions:} Could you fill this out for me please?)

For the learning experiment we'll be using this instrument here. It's called a memory, and it doesn't shock you, so don't worry about that. In these windows you'll be seeing trigrams like the ones you rated yesterday. They are grouped into eight pairs, and your job is to learn the pairs. This is what I want you to do. One trigram will appear at a time in the window here when I open it. And I would like you to say that trigram out loud, in any pronunciation you like. Then say "GOES WITH" and when the second trigram of the pair

appears, say that one. A blank space will appear between the pairs, and you'll continue this process with the remaining pairs as they come up in the window. In this way you will be learning which trigrams go with each other. For example it might look like this {sample trigrams are shown on a separate piece of paper}: You would say {trigram GAV is shown} "GAV goes with" {trigram RYM is shown} "RYM." {A space is shown, followed by BIF} "BIF goes with" {JUM is shown} "JUM." OK?

After you have seen all eight pairs here, we will switch to this window. The pairs are the same, but they will be in a different order in each window. So this pair might come later in the list {point at GAV-RYM}, while this one is first {point at BIF-JUM}, but the pair will still be exactly the same. The goal of the task is to be able to name the second trigram of each pair before it appears in the window. This will indicate that you have learned that pair. So, in the second window and on the trials that come after, say the first trigram when it appears, say "GOES WITH" and try to guess the second trigram before it pops up in the window. If you don't know what it is, you can do the same thing as the first time through, just name the first one, say "GOES WITH" and pronounce the second one after it does appear. We will continue with these trials until you can correctly name all the pairs in a row on two consecutive trials. So you need to get them all right, twice in a row. Does this make sense? Do you have any questions? {Addition questions of subject are answered.} Ok, first I need you to line yourself up so that you can see one trigram at a time in there... Now if you'll say the first one, I'll turn it on and we'll get started. {Subject begins task, experimenter changes windows at end of each trial and records hits and misses on all trials.}

APPENDIX K

Directions for Judges-Positive/Negative

Instructions for Coding Memories

Prof. W.G. Parrott
Department of Psychology
Georgetown University

The purpose of having judges rate the subjects' memories is to convert the relevant aspects of these verbal descriptions to a numerical form that we can analyze statistically. We are interested in two aspects of each memory: how positive and how negative it was for the subject. For each memory, you are to provide two ratings, each on a 1 to 7 scale. On this scale, the number 1 indicates the absence of positive or negative affect; the number 7 indicates very intense positive or negative affect. Positive and negative refer to emotions and evaluations. These categories do not discriminate between various emotions with the same valence. Thus, happiness, pride, affection, and belonging all count as positive; anger, sadness, fear, humiliation, and so forth all count as negative.

You might wonder why we need two numbers for each memory rather than just one, say, ranging from -6 to +6. The reason is that if we are to distinguish mixed emotions from no emotions, two scales are necessary. For example, subjects occasionally remember their high school graduations, and they often report that this occasion included not only happiness and pride but also sadness and anxiety (e.g., at leaving old friends and moving on to an uncertain future). Such memories seem to strike a balance between strong positive and negative feelings. Subjects also occasionally recall fairly unemotional events, say, watching TV after school. If we used a single scale, it would be impossible to capture the important differences between these memories, since both would have to be rated near zero on the -6 to +6 scale. Using two scales, the graduation memory might be rated something like (6,5) while the TV memory might score a (2,1). (Ratings of positive are listed before negative.)

We will practice on several memories from a pilot experiment before we rate the memories from our experiment. After making the practice ratings, we will compare our ratings

and discuss the issues and differences that arise. After this practice and discussion, you will find that you will be able to reach a high degree of agreement in your independent judgments. The following principles have been found to be helpful in the past. Let's discuss them before making our practice ratings.

I. The Objectivity Principle

Be as objective as you can. We have asked the subjects to describe their memories, and have specifically requested that they describe their feelings at the time the memory occurred. Even so, you will find that a certain amount of "reading between the lines" is necessary to reach a decision about the intensity of positive and negative affect in the memory. There are many reasons for this. The main reason is simply that it is the nature of human discourse to assume that your audience shares certain knowledge with you and that you don't need to spell everything out. Some subjects do this more than others, but it's nearly impossible to spell everything out, so all memories will require you to make certain inferences. Some memories will require more than this minimum, however. Some will be sketchy and vague, and you may have to use some intuition to infer the subject's evaluations and reactions to the events described. The point of the objectivity principle, however, is that such inferences would be strictly based on the information provided by the subject. As much as you can, believe what the subject says and resist engaging in armchair psychoanalysis. If the subject merely says that he or she felt "happy", then you may use contextual information that clearly indicates how intense this happiness was, but you should resist delving much more deeply than that. For example, the subject's statements about the significance of the event are clearly relevant in determining how happy "happy" is, but your own notions about how significant such events ought to be are not. This principle leads to two corollaries.

Corollary 1. The Subject is the Authority. Believe what the subject says. If the subject recalls learning that she made the junior varsity cheerleading squad, and she says that this was the greatest moment of her life and that she was on Cloud 9 for three weeks afterward, believe her. You are rating what the subjects say, not what you think they ought to say or what they relay probably meant to say despite their claiming the reverse.

Corollary 2. Emotional Intensity is Related to the Perspective of the Moment. The intensity of positive and negative affect is related to people's assessment. Rate the intensity of the event as it was experienced at the time, not as an objective assessment would dictate.

II. The Synchronic Principle

Your task as judge, to rate the affective tone of the event the subject recalled, presupposes that there is in fact a single overall level of affect present. But what if the memory involves a series of events that differ in their emotional content? The instructions to the subject were designed to minimize this possibility -- they were asked to recall single events. But "events" can sometimes have a narrative structure that involves a number of emotional episodes. A subject may recall being alone at a party (lonely), then meeting some new friends (happy) with whom he got drunk (fun) and then went driving around town (seemed great at the time) until they got into an accident and were arrested by police and taken to the station until they were picked up by their parents at 4:00 a.m. (fear and guilt), all of which made a great story the next day at school (humor). How do you assign a single rating to a memory like this? If possible, pick the time that seemed most salient to the subject, the time that seemed the focus of the story, the point that appears to have popped to mind first for the subject. This is sometimes difficult to do; fortunately, this problem is fairly rare. The point of the Synchronic Principle is that a string of emotional moments is not the same as a single moment of mixed emotions; therefore we should try to rate the one emotional moment that seems to be the focus of the story and ignore the other moments that are being described mainly to supply context. If you cannot determine what part of the story is the focus and what is the context, then you have no choice but to treat the memory as a diachronic unit, as a sort of "mixed emotion" spread out over time.

By the way, some subjects will nevertheless recall things that happened repeatedly, e.g. "going to soccer practice after school." The problem with this, of course, is that some soccer practices were fun, others were awful, and most were something in between. In these cases you will have to use your judgment and try to determine what general evaluation the subject has of this activity.

III. The Scale Calibration Principle

You want to try to use all 7 points of the scale. If you decide that a 6 or a 7 can be used only for the most powerful of human experiences, you may well only use the first five points on the scale for actual memories, and thus will in effect be using only a 5 point scale. Likewise, try to make 7 levels of discrimination; if you only use 1, 4, and 7, you're in effect using only a 3 point scale. "1" means none, "7" means extremely intense, "4" means indicates a moderate level. 2, 3, 5, and 6 allow you to make some intermediate

judgments. One of the purposes of letting you practice on pilot memories is so you can get a feel for the range of things that college students typically recall. This will help you develop standards you can apply in judging the memories. It will also give you the confidence to go a long time without using one end of the scale should you encounter a string of mild or intense memories. Your criteria should not get moved around as you judge the memories from the experiment.

Another purpose of the practice session is to allow all the judges to converge on a common calibration. My main concern is that you use the full range of the scale and that you be sensitive to differences between memories. If there are some differences between judges' criteria for the extremes, I will not be too worried. Some judges may tend to be a bit stingier or more generous than others. This is why I evaluate the reliability of the judges with the correlation coefficient rather than with some other measure. I am less concerned that judges agree on what is a "5" and what is a "6" than I am that judges be sensitive to differences between memories and agree that one memory is more or less positive or negative than another.

V. The Common Sense Principle

Repeated throughout the above discussion is the phrase "use your own judgment." The point of this final principle is that you should ignore any rule you might be following rather than allow it to cause you to give a rating that is blatantly stupid. As Dr. Spock says to parents, "You know more than you think you do."

APPENDIX L

Directions for Judges-Overall

Instructions for Coding Memories

Adapted in part from Prof. W.G. Parrott
Department of Psychology
Georgetown University

The purpose of having judges rate the subjects' memories is to convert the relevant aspects of these verbal descriptions to a numerical form that we can analyze statistically. We are interested in one particular aspect of each memory: its affective tone, or how positive or negative it was for the subject. For each memory, you are to provide a rating on a 1 to 7 scale. On this scale, the number 1 indicates very intense negative affect, while the number 7 indicates very intense positive affect. Positive and negative refer to emotions and evaluations. These categories do not discriminate between various emotions with the same valence. Thus, happiness, pride, affection, and belonging all count as positive; anger, sadness, fear, humiliation, and so forth all count as negative.

The scale we use to rate each memory reflects the idea that "positive" and "negative" are dialectical terms, representing diametrically opposite ends of a single concept which might be called "affective valence." Each term effectively defines the other, so that more of one implies less of the other, much the way "more tall" means "less short." Thus, a more positive emotional tone of an experience implies an intrinsic lessening of negative tone. For example, a experience of satisfaction with a job well done by definition implies that one is not dissatisfied with one's performance.

The use of a single bipolar scale for judging affect does not assume that every memory will be either completely positive or completely negative; mixed emotions are quite possible and even likely. However, our purpose is to rate the overall affective tone of the experience recalled. Strong negative emotions may counter strong positive emotions, or vice versa, so that the overall tone of this person's experience would be "balanced," scored as "4" on our scale. On the other hand, many memories will seem to lean in one

direction or the other, either slightly or dramatically. A preponderance of either positive or negative affective tone is indicated by an more extreme score either toward the low or high end of the scale. The question to keep in mind is: When all factors reported by the subject are weighed in, how positive or negative was this event as a whole?

We will practice on several memories from a pilot experiment before we rate the memories from our experiment. After making the practice ratings, we will compare our ratings and discuss the issues and differences that arise. After this practice and discussion, you will find that you will be able to reach a high degree of agreement in your independent judgments. The following principles have been found to be helpful in the past. Let's discuss them before making our practice ratings.

I. The Objectivity Principle

Be as objective as you can. We have asked the subjects to describe their memories, and have specifically requested that they describe their feelings at the time the memory occurred. Even so, you will find that a certain amount of "reading between the lines" is necessary to reach a decision about the intensity of positive and negative affect in the memory. There are many reasons for this. The main reason is simply that it is the nature of human discourse to assume that your audience shares certain knowledge with you and that you don't need to spell everything out. Some subjects do this more than others, but it's nearly impossible to spell everything out, so all memories will require you to make certain inferences. Some memories will require more than this minimum, however. Some will be sketchy and vague, and you may have to use some intuition to infer the subject's evaluations and reactions to the events described. The point of the objectivity principle, however, is that such inferences would be strictly based on the information provided by the subject. As much as you can, believe what the subject says and resist engaging in armchair psychoanalysis. If the subject merely says that he or she felt "happy", then you may use contextual information that clearly indicates how intense this happiness was, but you should resist delving much more deeply that. For example, the subject's statements about the significance of the event are clearly relevant in determining how happy "happy" is, but your own notions about how significant such events ought to be are not. This principle leads to two corollaries.

Corollary 1. The Subject is the Authority. Believe what the subject says. If the subject recalls learning that she made the junior varsity cheerleading squad, and she says that this was the greatest moment of her life and

that she was on Cloud 9 for three weeks afterward, believe her. You are rating what the subjects say, not what you think they ought to say or what they relay probably meant to say despite their claiming the reverse.

Corollary 2. Emotional Intensity is Related to the Perspective of the Moment. The intensity of positive and negative affect is related to people's assessment. Rate the intensity of the event as it was experienced at the time, not as an objective assessment would dictate.

II. The Synchronic Principle

Your task as judge, to rate the affective tone of the event the subject recalled, presupposes that there is in fact a single overall level of affect present. But what if the memory involves a series of events that differ in their emotional content? The instructions to the subject were designed to minimize this possibility -- they were asked to recall single events. But "events" can sometimes have a narrative structure that involves a number of emotional episodes. A subject may recall being alone at a party (lonely), then meeting some new friends (happy) with whom he got drunk (fun) and then went driving around town (seemed great at the time) until they got into an accident and were arrested by police and taken to the station until they were picked up by their parents at 4:00 a.m. (fear and guilt), all of which made a great story the next day at school (humor). How do you assign a single rating to a memory like this? If possible, pick the time that seemed most salient to the subject, the time that seemed the focus of the story, the point that appears to have popped to mind first for the subject. This is sometimes difficult to do; fortunately, this problem is fairly rare. The point of the Synchronic Principle is that a string of emotional moments is not the same as a single moment of mixed emotions; therefore we should try to rate the one emotional moment that seems to be the focus of the story and ignore the other moments that are being described mainly to supply context. If you cannot determine what part of the story is the focus and what is the context, then you have no choice but to treat the memory as a diachronic unit, as a sort of "mixed emotion" spread out over time.

By the way, some subjects will nevertheless recall things that happened repeatedly, e.g. "going to soccer practice after school." The problem with this, of course, is that some soccer practices were fun, others were awful, and most were something in between. In these cases you will have to use your judgment and try to determine what general evaluation the subject has of this activity.

III. The Scale Calibration Principle

You want to try to use all 7 points of the scale. If you decide that a 1 or a 7 can be used only for the most powerful of human experiences, you may well only use the middle five points on the scale for actual memories, and thus will in effect be using only a 5 point scale. Likewise, try to make 7 levels of discrimination; if you only use 1, 4, and 7, you're in effect using only a 3 point scale. "1" means extremely negative, "7" means extremely positive, "4" means balanced. 2, 3, 5, and 6 allow you to make some intermediate judgments. One of the purposes of letting you practice on pilot memories is so you can get a feel for the range of things that college students typically recall. This will help you develop standards you can apply in judging the memories. It will also give you the confidence to go a long time without using one end of the scale should you encounter a string of mild or intense memories. Your criteria should not get moved around as you judge the memories from the experiment.

Another purpose of the practice session is to allow all the judges to converge on a common calibration. My main concern is that you use the full range of the scale and that you be sensitive to differences between memories. If there are some differences between judges' criteria for the extremes, I will not be too worried. Some judges may tend to be a bit stingier or more generous than others. This is why I evaluate the reliability of the judges with the correlation coefficient rather than with some other measure. I am less concerned that judges agree on what is a "5" and what is a "6" than I am that judges be sensitive to differences between memories and agree that one memory is more or less positive or negative than another.

V. The Common Sense Principle

Repeated throughout the above discussion is the phrase "use your own judgment." The point of this final principle is that you should ignore any rule you might be following rather than allow it to cause you to give a rating that is blatantly stupid. As Dr. Spock says to parents, "You know more than you think you do."

VI. Examples

To illustrate these principles, here are three example memories and possible scores for each. These are not meant to be criteria to which you must compare the actual memories you judge. They should serve to show how some common elements of memories may be reflected in a score.

1. Event: My sister's dog getting killed by a car.

How did you feel about this event? Crushed. I felt so bad for her, because she doted on that dog. But I was really relieved it wasn't my cat.

Rating and explanation: "2" The clearly negative affect could be scored as a "1" if it stood alone. However, the positive aspect is present as a counterbalance, so a slightly less extreme score is given. Some judges might think it is unusual to feel "relieved" at an otherwise tragic event, but it is important to believe the subject's report of his/her experience.

2. Event: Visiting the state capitol.

How did you feel about this event? Just being there supported my dream of being a representative and lawmaker. But the tour guide made it sound so dull that I was pissed off the whole time.

Rating and explanation: "4" The occurrence of fairly strong positive feelings can be inferred from the first sentence. Yet the fairly strong negative feelings stated in the next sentence approximately balance the positive affect.

3. Event: Graduation.

How did you feel about this event? I thought I would be sad, but when the time came, I was ecstatic.

Rating and explanation: "7" Previous expectations occurring before the recalled event seem to be context. Emotions of the actual event are clearly and strongly positive.

APPROVAL SHEET

The thesis submitted by MARY L. WANDREI has been read and approved by the following committee:

Dr. Joseph F. Rychlak
Professor, Psychology
Loyola University Chicago

Dr. Jeanne S. Albright
Assistant Professor, Psychology
Loyola University Chicago

The final copies have been examined by the director of the thesis and the signature which appears below verifies the fact that any necessary changes have been incorporated and that the thesis is now given final approval by the Committee with reference to content and form.

The thesis is therefore accepted in partial fulfillment of the requirements for the degree of MASTER OF ARTS.

12/8/92
Date

Joseph F. Rychlak
Director's Signature